



FRIDAY, OCTOBER 21.

## NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

**Meetings Next Week.**—Cincinnati, Indianapolis, St. Louis & Chicago; Seattle, Lake Shore & Eastern.

**Elections.**—Arcade, Charles P. Daly, President.—Evansville & Indianapolis, Edwin Taylor, President.—Mexican National, Henry Yonge, Superintendent.—Santa Monica Outlook, Abbott Kinney, President.—Wheeling, Wellsburg & State Line, S. George, President.

**New Companies Organized.**—Crest Railroad is chartered in Tennessee.—Decatur & South Mountain Mineral Belt Line is chartered in Alabama.—Paragould & Buffalo Island is incorporated in Arkansas.—Wheeling, Wellsburg & State Line is organized in West Virginia.

**Changes and Extensions.**—Alabama: Nashville, Chattanooga & St. Louis complete Elora branch. Nottingham Railroad & Improvement Co. will build extension.—Arkansas: Batesville & Brinkley will build 25 mile extension. Shreveport & Arkansas begins tracklaying.—Colorado: Denver & Rio Grande will build to Del Norte.—Dakota: Duluth, Dakota & Manitoba is being graded.—Florida: Augusta, Gibson & Sandersville will extend line to St. Andrew's Bay.—Indian Territory: Denison & Washita Valley will build 80 miles extension.—Kansas: Chicago, Burlington & Quincy has Oxford & Kansas completed.—Minnesota: Winona & Southwestern has survey completed to Mason City, Ia.—North Carolina: Cape Fear & Yadkin Valley will build branch.—Ohio: Ohio & Northwestern will be changed to standard gauge.—Wisconsin: Chicago, Milwaukee & St. Paul will build 10-mile branch. Milwaukee, Lake Shore & Western will build 75 mile extension.

**Traffic.**—Anthracite coal shipments for the week ending Oct. 15 show a decrease of 8.0 per cent., as compared with the same period last year; bituminous shipments show an increase of 15.1 per cent. Cotton receipts, interior markets, for the week ending Oct. 14 show an increase of 9.1 per cent., as compared with the corresponding week last year; shipments show an increase of 11.9 per cent.; seaport receipts show an increase of 20.2 per cent.; exports an increase of 4.1 per cent.; cotton in sight is greater than at the same date last year by 18.9 per cent.

**Earnings.**—Gross earnings for the month of September are reported by 56 roads, with an increase of 12.0 per cent., 44 showing an increase and 12 a decrease. For the month of August 13 roads report gross and net, with a net increase of 35.6. For the eight months ending Aug. 31, 12 roads report gross and net earnings, showing an increase in net of 14.4 per cent. Forty-eight roads report gross earnings for the nine months ending Sept. 30, with an increase of 15.4 per cent., 43 having an increase and 5 a decrease.

**Miscellaneous.**—Governor of New Hampshire vetoes the Hazen bill.—St. Louis, Keokuk & Northwestern is sold.

## Contributions.

## What is the Cost of Transportation?

NEW YORK, Oct. 7, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your admirable editorial in to-day's paper on English and American railroads you estimate that the cost of passenger service in this country is about 90 per cent. of what is received for it and that of freight only 50 per cent., that the profit on passengers is therefore only 11 per cent., while on merchandise it is 100 per cent. or more; in other words, the figures given by railroad companies in their annual reports are arbitrary and misleading, and, if carefully calculated as closely as they could possibly be, they would show far different relative profits. Do I rightly understand you? I do not forget that your figures claim to be only approximations. From *Poor's Manual* I take the following figures (for 1886) as samples:

## FREIGHT.

	Cents per ton per mile.			
	Expenses	Earnings	Profit	Per cent. of expenses
Pennsylvania Railroad	0.423	0.695	0.272	61
New York Central	0.530	0.780	0.250	70
Newp. News & Miss. Val.	0.413	0.632	0.219	65
Fonda, Johnstown & G.	.....	10.09	.....	.....

## PASSENGER.

	Cents per passenger per mile.			
	Expenses	Earnings	Profit	Per cent. of expenses
Pennsylvania Railroad	1.797	2.245	0.448	80
New York Central	1.220	1.840	0.620	86
Newp. News & Miss. Val.	2.033	2.230	0.197	91
Fonda, Johnstown & G.	.....	2.800	.....	.....

According to this showing the Newport News &amp; Mississippi

Valley has apparently divided its expenses about right, the passenger fare being moderate, the train load fair (29.42 passengers per train) and the cost 91 per cent. of the receipts. But if this is true, then the Pennsylvania has calculated its passenger expenses too low and those of freight too high; and the New York Central has done still worse. And the four and five miles per ton per mile which have been boasted of as the lowest cost-figures in the world ought to be still further reduced. Now, how do these roads arrive at these figures? Do they assume that a passenger is on the average equal to a certain quantity of freight, and then try to see how near the facts come to the assumed amounts? Or do they simply place expense items on whichever side of the book may in any particular year be best able to bear it?

These roads must have been collecting unreasonable profits on freight, and using the money to reduce the passenger expense account. If they have been working this deception for a series of years, why have not you exposed them? Which items are the hardest to divide, and what officer makes the arbitrary decisions that turn the balance in the way that will best deceive the public and please the stockholders?

If the trunk lines, when they have been carrying corn at a quarter of a cent a ton per mile, have still done business at a profit instead of a loss, you ought to have let the light of day in upon their methods. It is to be hoped that the freight agent who delights in impoverishing his employer for the sake of having a little cheap revenge on the fellow next door, who works for another road, will not hear of these facts lest he become still more reckless. Looking to you as the embodiment of all railroad wisdom, the undersigned propounds these questions; and, with the determination of the Ku Klux who held a pistol at Nasby's head, "expec prompt answers."

K. K.

[The trouble with this argument is that the three roads in question are not samples. They all have very low freight rates in proportion to their passenger rates. The railroads of the country as a whole have an average ton-mile rate of 1.04 cts., and an average passenger-mile rate of 2.18 cts. The three roads cited have on an average a ton-mile rate of not quite 0.70 cts., and a passenger-mile rate of a little over 2.10 cts. For the whole country the passenger rate is not much more than twice the rate per ton; for the roads in question it is fully three times the rate per ton. If the proportion of passenger to freight rates were the same for these roads that it is for the whole country, two of them would show an actual deficit on their passenger business.

If we want to use these figures rightly, we must go to work in another way. The average of expenses per ton mile on the three roads is 0.45¢; per passenger mile it is 1.68 cents. The latter is  $3\frac{7}{10}$  times the former. If we assume the same ratio to prevail elsewhere—and there is no very marked reason why it should not—we have the following series of proportions:

(1) Passenger-mile expenses: ton-mile expenses =  $3\frac{7}{10} : 1$ .

(2) Passenger-mile earnings: ton-mile earnings =  $2.18 : 1.04 = 2\frac{1}{10} : 1$  (approximately).

Dividing (1) by (2) we have

(3) Ratio of expenses to earnings in the passenger business: ratio of expenses to earnings in the freight business =  $\frac{3.7}{2.1} : 1 = 37 : 21$ .

Let  $x$  = the ratio of expenses to earnings in the freight business; let  $a$  = aggregate freight earnings,  $b$  = passenger earnings, and  $p$  = total expenses for freight and passengers both. Then

$$ax + \frac{37}{21}bx = p.$$

This equation applied to the changing circumstances of successive years gives an average ratio of expenses to earnings in the freight business of from 48 to 52 per cent., while that in the passenger business varies from 84 to 92 per cent. These figures cannot be regarded as accurate or certain; but as far as they go they tend to show that our original estimate was not far from the truth.

So much for the facts in the case. The reasons must be explained in another column.—EDITOR RAILROAD GAZETTE.]

## Freight Brakes.

PHILADELPHIA, Oct. 11, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your editorial of the 7th inst., under the head of "The Recent Brake Tests at Burlington," you substantially declare that the freight brake problem has been solved without the aid of electricity as an auxiliary.

I entirely agree with you in that "the eminent services of Mr. Westinghouse have placed him on a level with the foremost," but I do not think it entirely fair that you should assume from the recent "ex parte" demonstration made at Burlington that you can "congratulate the railroad world on the acquisition of a perfectly efficient brake operated by simple means already in use," etc.

It is a matter of regret that you were unable to give the same exhaustive detail in connection with these recent individual experiments that you gave to the tests under the supervision of the Master Car-Builders' Association committee. Yet I assume that the portion of the public most im-

mediately interested in railway improvements will conclude that the data given you were sufficient to warrant your editorial.

You can, however, readily appreciate that competitive interests (and there are and should be such interests) may feel wronged that the leading railway journal should give such prominence to any one system, unless you are willing to have such "prominent articles" commented upon or criticised in your columns.

You are well aware that, in formulating requirements by the Master Car-Builders' Association in "Burlington tests," a very prominent condition was that trains should be composed of loaded and empty cars. And you are as well aware that the impacts or shocks in tests of 1886 were such as to compel brake managers to ask from the committee the elimination of loaded cars in the tests of 1887. And you know that tests of 1887 were made with empty cars only, aided by electric attachments to atmospheric brakes in order to secure simultaneous application; this to prevent the impact or shock so disastrous in the tests of 1886.

Were these tests of 1887 a fair guide to railway managers in everyday practical running of freight trains? And were the private tests made by the Westinghouse Co. in accordance with every day practical railroading, or were they made with empty cars only?

If the Burlington tests or the subsequent private tests were made with empty cars only (where uniform pressure and uniform weight obtain), I fail to see any material development beyond the passenger service of the past few years. The increased cross section of pipe is at the expense of air and steam, and is valuable only in emergency, and does not obviate the great trouble, viz., impact.

I am sure you will agree with me in the following concrete propositions:

1. The present policy of railway management is to load upon cars as much freight as is consistent with the advanced arts in the construction of trucks and springs.

2. Rapid transit of freight is regarded as important, the life and use of cars being more fully appreciated than in the past.

3. To secure the best economy in rapid transit of freight, a good system of continuous brakes is essential.

4. The exhaustive tests at Burlington, Iowa, in 1886 and 1887 demonstrated that the material drawback to continuous freight brakes was the impact or shock on long trains.

5. The tests (so called) in 1887 made by electro-atmospheric brakes, with empty cars only, were in no degree of such character as to warrant adoption by railway companies, these tests (?) not having been made in accordance with requirement of every day practical railroading, to wit, mixed trains of loaded and empty cars.

The estimate made by the Committee of the M. C. B. Association for every-day working of 50-car trains was 33 loaded cars and 17 empty. The 33 cars were estimated to be loaded with 40,000 lbs. each, the weight being about 22,000 lbs. each, or an aggregate of 62,000 lbs. per loaded car, as compared with 22,000 lbs. per empty car. The train composed of 50 empty cars would weigh 1,100,000 lbs., and the train of 33 loaded and 17 empty cars would weigh 2,420,000 lbs. The empty train, therefore, weighs 45.5 per cent. of the mixed train.

Under present methods, the pressure being uniform throughout the train and limited to the tare weight of the car, 22,000 lbs., we only utilize about 45.5 per cent. of the retarding power, or, in other words, in a train of 50 cars composed of 33 loaded and 17 empty, we are receiving more shock and making no quicker stop than could be made with train of 110 empty cars, assuming that time of application of power would be the same. In the 33 loaded cars we have an unchecked momentum of 40,000 lbs. per car, or the equivalent of say 60 empty cars.

In conclusion, I would ask which will in the greater degree lessen the shock and make the quicker stop in a train of 33 loaded and 17 empty cars, the electro atmospheric limited to empty car power, or automatic air, braking each car in proportion to load?

I believe that the "perfectly efficient" freight brake for the future must be one that will at least approximately apply the power in proportion to the load on the wheels. A. T. G.

[The recent trials of the Westinghouse brake reported in our issue of Sept. 30 were made with a train of 50 empty cars, but our correspondent is mistaken in asserting that the 1887 trials at Burlington were made only with trains of empty cars. As our readers are well aware, the tests were made first with trains of 50 empty cars and then with trains composed of 33 loaded and 17 empty cars. When the brakes were applied by electricity, no shocks were felt in either series of tests. Comments on other points in our correspondent's letter will be found in another column.—EDITOR RAILROAD GAZETTE.]

## The Brooklyn Bridge Terminals.

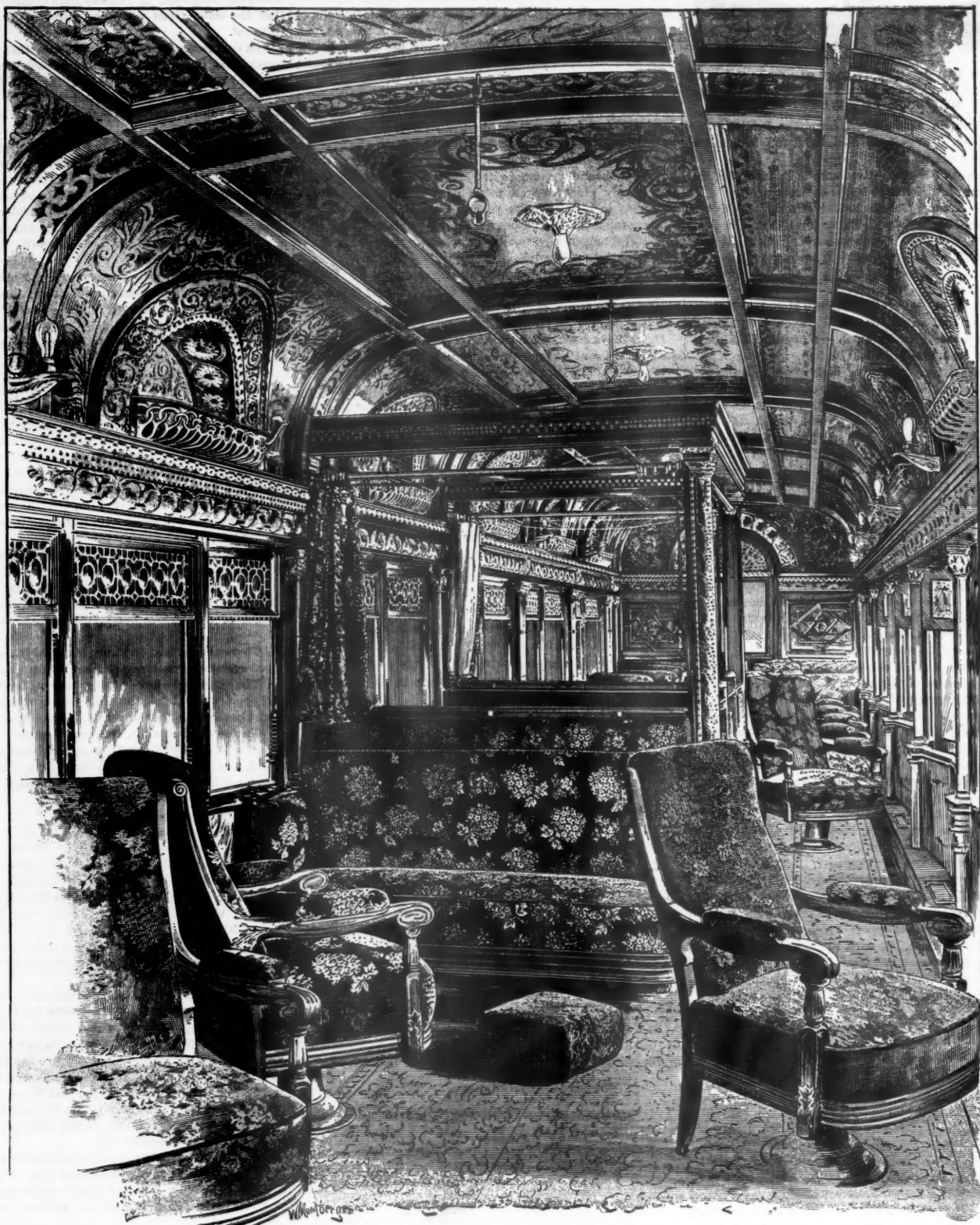
KANSAS CITY, Mo., Oct. 10, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My patent, illustrated in your issue of Sept. 30, may be made invalid by the device noted by "Observer;" that is not of interest to the public, the subject is.

The use of loop tracks at the termini of the Brooklyn Bridge has been advocated by eminent authority; the use of turn tables has also been advocated; but I was not aware that the construction of such a platform in annular rings had been, hence the study which resulted in the device illustrated. This bridge, built at so great a cost, and of an importance probably second to none in the world, is worthy of





INTERIOR OF DRAWING ROOM CAR.

*Built for the BOSTON & ALBANY RAILROAD by the WASON MFG. CO., Springfield, Mass.*

corresponding care in the study of devices for increasing its efficiency, and it is not likely that any one person will solve the whole problem. Many devices will no doubt be presented before the question is settled, each having its advocates and objectors.

The first objection of "Observer" to this device seems trivial. The outgoing passenger will probably reach the top of the staircase at such a point as happens to be most convenient for him, and if he should unfortunately fail to reach one train, while pondering over his mishap he will be in front of another, there being no device for sweeping him off the platform, and its breadth giving room for both outgoing and incoming passengers without crowding. With cars having narrow doorways at the ends, it may require 50 seconds to load and unload, but if entered from the side such time is clearly unnecessary.

The size of the turntable would be a matter for study. The size indicated by "Observer" is probably less than would be most advantageous. As to the increase to 425 ft., it would naturally be accompanied by corresponding increase in the size of stairway. The choice of doors for entrance might be difficult, but as no parlor or sleeping cars are run on the bridge, that might not be an insuperable objection to entering some of the dozen doors which would be convenient of access.

The objections to trains coming into contact with each other is not such as would be the case were these trains

operated by different power. With the 425-ft. platform running at 10 miles per hour, the whole track could be, if wished, practically full of cars. As some 16 of these would come in and depart per minute, it does not seem that the maximum carrying capacity of the device was overstated at 1,000 passengers per minute.

Mechanical difficulties of construction and operation are not of a nature to interest the public. To the writer these do not seem great, but other engineers may disprove my views. So far, I have been unable to see their impracticability.

G. W. PEARSONS.

#### Drawing-Room Car, Boston & Albany Railroad.

Four remarkably handsome drawing-room cars have been built late y for the Boston & Albany Railroad by the Wason Manufacturing Co., of Springfield, Mass. The credit for the general design of the car and its constructive details belongs to the veteran master car-builder of the road, Mr. F. D. Adams. The interior finish of the cars was designed by Mr. Bruce Price, the eminent architect who designed the decorations and interior finish of the well-known bay window cars on the Pennsylvania Railroad.\*

Each of the four cars is 64 ft. long over end sills, 9 ft. 6 in. wide outside sills and 8 ft. 8 in. floor to ceiling. Two of the

\* This car was illustrated and described in the *Railroad Gazette*, Aug. 29, 1884.

cars have smoking rooms and accommodate 27 passengers. The other cars have 36 seats. All the cars are carried on two six-wheeled trucks of the ordinary Boston & Albany pattern. Allen paper wheels are used, 42 in. diameter on tread, the wheelbase of each truck being 11 ft. The centre wheels of each truck have no flanges. The cars are heated by the Martin system, which is now used on upwards of 100 cars on the Boston & Albany.

The cars are lit by electricity, the Julien battery being employed. The roof framing is novel and simple, the carlines being made of straight-grained ash 1 in. by 1/2 in., three being laid together and glued up on a form, so that when dry the carlines are curved to the form of the roof. The weight of each car complete is about 80,000 lbs.

The interior finish is in mahogany, richly carved, and with metal work of statuary bronze. Mr. Price has been most happy in the treatment of the turtle back ceiling and the bay window sides. The designs and decorations are pure "Byzantine." The colors are so low in tone that on first entering one is impressed with its refined and restful elegance, entirely free from any glitter other than that of the leaded crystal plate glass over each window.

The makers and designers have very successfully endeavored to make a car that would enable one to shorten a journey, by providing various conveniences that require some study to be fully appreciated. Every piece of metal work from the heat register in the floor, the umbrella cup and



holder (by the side of each chair), the capitals and bases, sash trimmings, bundle racks, and old Roman lamp, to the electrolier in the ceiling—all so quiet in color as to be hardly noticeable unless looked for—is in itself an art study.

The ceiling is in imitation of old leather with a ground of tarnished gold, the decoration being in delicate off hand pencil lines.

The lunette or baggage rack window, which is shown in the accompanying engraving, enables the rack to be placed so that it projects but 3 or 4 in. into the car, yet affording the usual baggage space. It is especially serviceable in breaking the sides of the ceiling, so that the impression of a tunnel is completely obviated, and it gives an appearance of greater width and height, and affords a flood of light upon the surface of ceiling heretofore in shadow. It can also be arranged to assist the ventilation, as do the old deck windows.

### The Aluminum Alloys.

The invention of the electric furnace by Messrs. E. H. and A. H. Cowles has brought on the market new varieties of copper, brass and iron alloys with aluminum, which promise to have an increasing value for constructive purposes as the knowledge of their properties increases and the cost of production decreases. The Messrs. Cowles have taken advantage of the high heat developed by resistance to a strong current of electricity to imbue grains of corundum with copper in a cylinder of powdered charcoal, to the ends of which are connected two carbon electrodes, the whole being surrounded with charcoal in a box of fire-brick. The resistance offered to the passage of the electric current fuses, and possibly volatilizes, the aluminum in the emery, and it combines with the copper forming an alloy containing from 15 to 20 per cent. of aluminum. By substituting this alloy for pure copper an alloy richer in aluminum may be secured. When an alloy containing both aluminum and silicon is desired, clay is used in place of corundum, and when an alloy for "mitis" or steel casting is desired the copper is replaced by iron.

The "special" bronze, which contains from 10 to 11 per cent. of aluminum, with 89 to 90 per cent. of copper, has a tensile strength of about 100,000 lbs. per square inch, a larger proportion of aluminum making the bronze too brittle, and the percentages of 7½, 5, 2½ and 1½ aluminum give tensile strengths decreasing from 65,000 to 25,000 lbs., the ductility increasing as the tenacity decreases till the metal containing only 1½ per cent. of aluminum will stretch nearly two-thirds of its length before breaking.

These bronzes melt at about 1,700° F., and as neither copper nor aluminum volatilizes except at extremely high temperature, it is claimed they can be repeatedly remelted without appreciable changes in their strength.

In a paper to be read before the United States Naval Institute by Mr. Cowles, advocating the use of the special bronze for guns cast either on the Rodman plan or bored after casting and muddled as proposed by Mr. S. B. Dean, known as the "Uchatius" method, the following table of the tenacity, etc., of various gun metals and aluminum bronzes is found:

	Elastic limit.....	Extension per unit of length.....	Tensile strength per sq. in. of original section.....	Elongation after fracture.....
Average of 137 specimens of accepted gun steel for hoops, tubes, etc., oil tempered and annealed, U. S. Government tests.....	Lbs. 51,611	0.00207	Lbs. 96,150	Pr. ct. 19.93
Same grade of steel not oil tempered, and not annealed. 19 specimens.....	38,140	0.0016	88,000	18.7
Wrought iron, small bars.....	30,000	0.0016	73,000	17.0
Cast iron, Watertown tests.....	17,000	0.0009	30,000	6.168
Gun bronze.....	13,214	0.0012	38,935	33.6
Heavy forgings, 700 tests at Sir W. Armstrong's.....	23,760	.....	48,161	.....

### ALUMINUM ALLOYS.

Special bronze, Cu. 80, Al. 10. Sl. 1.....	69,749	.....	114,514	4.5
.....	79,894	.....	95,366	0.5
.....	.....	.....	109,823	0.5
.....	.....	.....	128,000	0.0
.....	.....	.....	97,380	0.0
.....	.....	.....	115,360	0.0
.....	.....	.....	118,500	0.0
A <sub>1</sub> , Bronze forged at red heat.....	38,000	0.00232	81,700	5.2
A <sub>2</sub> , Bronze cast in sand.....	41,000	0.00259	87,000	2.0
A <sub>3</sub> , Bronze forged.....	.....	.....	87,519	17.0
A <sub>4</sub> , Bronze Cu. 91½, Al. 7½, Sl. ¼, cast in chill mold.....	21,500	0.00133	83,800	35.5
.....	34,000	0.0018	69,800	32.8
.....	.....	.....	68,000	18.2
.....	.....	.....	74,700	2.0
.....	.....	.....	68,930	48.0
.....	.....	.....	71,700	40.0
Aluminum brass No. 1, Cu. 71½, Al. 3½, Zn. 25, cast in chill mold.....	21,500	0.0018	63,450	11.2
Aluminum brass No. 2, Cu. 63½, Al. 3½, Zn. 33½, cast in chill mold.....	47,000	0.0091	76,800	3.5
Aluminum brass, small bars, cast in sand.....	.....	.....	91,500	0.0
.....	.....	.....	88,950	4.0

Thurston, in his "Materials of Engineering," says: "The alloys of aluminum are very valuable. Its remarkable lightness, combined with its strength, make it useful as a constituent of those alloys in which strength and lightness are the needed qualities. In compression this alloy (aluminum 10) has been found capable of sustaining 130,000 lbs. per square inch, and its ductility and toughness were such that it did not even crack when distorted by the load. It is so ductile and malleable that it can be drawn down under the hammer to the fineness of a cambric needle. It works well, casts well, holds a fine surface under the tool and when exposed to the weather, and it is in every respect considered the best bronze yet known. It has great elasticity when made into springs; it has been found useful for watches, and

has the decided advantage over steel of being little liable to oxidation."

The makers claim for it that the copper and aluminum have a chemical affinity for each other; that salt water, urine, fatty matters, juice of plants, sulphureted hydrogen and coal gas do not affect it. Hydrochloric acid dissolves out the aluminum, and concentrated sulphuric acid forms a coating over it which protects it, but dilute sulphuric acid and strong alkalis attack it. The alloy having from 5 to 2½ per cent. of aluminum is nearer to gold than any other substance, and only second to gold and platinum in its resistance to oxidation.

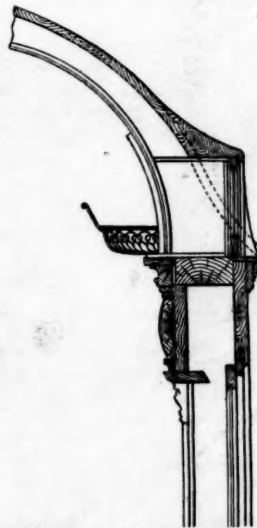
All these bronzes except the special can be rolled, swaged, spun and drawn cold. It is made stronger by working, which can be best done at a bright red heat, and finished cold, which hardens it, but it can be softened by annealing. It can be soldered with hard or soft solders, and is a good anti-friction metal.

Of the aluminum brass the Messrs. Cowles say that while it is not as strong as the special bronze it can be highly recommended for many purposes, among others valves and valve seats for pumps working under high pressure, worms and worm wheels, mining, hydraulic and dredging machinery. Wire made from it showed a tensile strength of over 90,000 lbs. per square inch, and screws made from this wire were driven into oak timber up to their heads without twisting of the heads or breaking it in any way. This metal, with a tensile strength of 93,000 lbs., has been used for the hubs of the Brush electric dynamos.

An aluminum-tin bronze is also made with aluminum 1 to 2 per cent., tin 4 per cent., and copper, which makes very sharp castings, takes a high polish, is non-corrodible, and works easily under cutting tools.

The application of aluminum to casting wrought-iron has been described, and its use in steel casting, which promises, through the fluidity imparted to the charge by the low melting point of aluminum to give castings free from blow-holes without impairing their strength.

By substituting pure sand for corundum in the electric fur-



Drawing Room Car, Boston & Albany Railroad.  
Cross Section through Lunette and Baggage Rack.

nace an alloy of copper and silicon is formed called silicon bronze, which is stronger than steel, resists corrosion better and may have nearly three times the electric conductivity of steel. These properties give this metal great value for telegraph and telephone wires, particularly where long spans are required, and the small size of the wires enables them to resist wind and sleet storms better than the ordinary steel wires.

A patent has recently been granted in France for the extraction of aluminum from its oxide by the combined action of carbon, sulphide of carbon and heat. Aluminous carbon is obtained by mixing powdered alumina with 40 per cent., by weight, of powdered charcoal or lampblack; to this mixture is added a sufficient quantity of any oil or tar to form a thick paste. This paste is placed in a closed vessel capable of standing a high temperature, and is calcined to a red heat for the purpose of decomposing the oil or tar, and the coherent mass of aluminous carbon thus obtained is broken up into small pieces. The pieces are placed in a closed vessel provided with pipes, one of which leads a current of gaseous sulphureted carbon into the mass until the reaction is complete, and the other allows of the escape of the carbonic oxide produced. The sulphureted aluminum thus obtained is treated at a red heat in a closed vessel having pipes, with a current of carbonated hydrogen. The latter unites with the sulphur, producing sulphureted hydrogen, leaving the pure aluminum.

### Florida Rates.

The more important portions of the circulars issued by the Florida Board of Railroad Commissioners, in which they prescribe the freight and passenger rates for the railroads of the state, in accordance with the recent action of the Legislature, are given below. The parts omitted refer generally to the points which are common to all tariffs; the wording is condensed in several of the passages shown:

TALLAHASSEE, Oct. 1, 1887.

### CIRCULAR NO. 1.

The following Standard Passenger Tariff and Rules will go into effect Nov. 1, 1887:

The rate of transportation for passengers shall be (3) three cents per mile.

Each passenger shall be entitled to 150 lbs. baggage without additional charge. Baggage in excess to be charged for at double first-class freight.

Railroad companies will not be prohibited from charging less than the rate prescribed, provided such a charge is not

an unjust discrimination in favor of or against persons or localities.

The minimum charge for any distance shall not be less than 10 cents. Between this date and Nov. 1 reasons why changes should be made in said tariff and rules will be heard, and on Oct. 24 the Commission will meet at their office to hear such reasons, and such changes will be made as to them shall seem just and reasonable.

TALLAHASSEE, Oct. 1, 1887.

### CIRCULAR NO. 2.

The following standard freight tariff and rules governing the transportation of freight will go into effect Nov. 1, 1887: (Rates per 100 lbs. are given for distances from 10 (and under), to 400 miles, and there are 14 classes already filled besides others left blank for future action. We give extracts from the table showing the first four classes. The 5th, 6th, and 7th are graded in the usual manner, but B, C, D, E, F, H and J are in the nature of commodity rates.)

STANDARD FREIGHT TARIFF (Extracts from).				
	1	2	3	4
10 miles and under.....	20	18	16	14
20 " " over 10.....	27	23	20	19
30 " " " 20.....	35	30	26	22
100 " " " 90.....	54	54	48	40
200 " " " 180.....	85	74	61	49
400 " " " 390.....	103	92	74	61

The Commission will postpone until its next session fixing the rates on classes G, K, E, M, N, O, P, R, S, and V, and in the meantime invite fuller information concerning them.

The Standard Freight Tariff will be the basis upon which such changes as appear to be just and reasonable from time to time will be made. Parties interested may submit reasons why changes should be made.

The Commission will meet in Tallahassee, Oct. 24, and hear reasons, and make whatever modifications shall seem just and reasonable.

### RULES GOVERNING THE TRANSPORTATION OF FREIGHTS.

1. All connecting railroads which are under the management and control by lease, ownership or otherwise, of one and the same company, shall \* \* \* be considered as constituting but one and the same road.

2. Minimum charge 25 cents.

3. The rates fixed by the Commission are maximum rates, which shall not be transcended by the railroads. They may, however, carry at less than the rates fixed, provided, that if they carry for less for one person, they shall for the like service carry for the same lessened rate for all persons, except as mentioned hereafter, and if they adopt less freight rates from one station they shall make a reduction of the same per cent at all stations along the line of road, so as to make no unjust discrimination as against any person or locality. But when from any point in this state there are competing lines of transportation, any railroad may at such competing point make rates below those fixed by the Commission to meet such competition without making a corresponding reduction along the line of road.

Rule 4 names various staple articles, chiefly agricultural products and coarse freight, on which the rates may be reduced at the roads' discretion, without regard to the limitations of Rule 3; and some articles in the classification are left open (being marked "special"), so that roads can make rates at will. Rule 6 provides that freight when carried on passenger trains may be charged 1½ first class. Rule 7 allows extra charges to be made for handling heavy articles, and prescribes the rates therefor.

10. There shall be no secret reduction of rates, and no rebate, bonus, drawbacks or other advantage in any form shall be given, either directly or indirectly, upon shipments made, or service rendered to any person, not allowed to all other persons, but the rate shall be uniform to all and public.

12. Each road shall post at each freight and ticket office a copy of its tariff. This rule shall apply to all rates made by railroads at competing points under the exceptions to Rule 3.

13. No road shall by reason of any agreement, arrangement or understanding as to the transportation of freights, according to percentage or otherwise, between it and any other railroad companies, permit any blockade of any class of freight.

14. Connecting roads may pro rate \* \* \* Provided, the total charge is within the maximum limit fixed for the same distance on one road. Copies of all such agreements must be filed with the Commission.

15. Unjust discrimination in the delivery of freight to any competing lines of steamboats in this state is forbidden.

Rule 16 gives estimated weights for live stock and the usual other articles, and the minimum car load (24,000 lbs.).

Rule 19 provides that contracts and agreements between roads shall be submitted to the Commission for approval.

Every road must make a monthly report of earnings and expenses and also an annual report for the calendar year, both on forms prescribed by the Commission. Other rules refer to features not specially noteworthy.

Circular No. 3 gives the freight classification.

### Flowers at Your Station.

This article is a sort of horticultural tract. It will not plead the cause of the silent beauties of the fields and gardens, but of those who ask, "Is a flower-bed at my station worth the trouble?"

"H't lavender, mints, savory, majoram,  
The marigold, that goes to bed with the sun,  
And with him rises,

will they pay? No doubt of it if you will accept the coin current in their realm. Flowers at the station pay by the neat, attractive air they throw about it. They may not increase business, but they show that careful men are in charge. They assist in a very real if silent fashion in making and keeping the station neat—a tidy, cheerful inn for the road's guests.

Here is a single fact: A wealthy family in search of a place for the summer were attracted by a bed of scarlet geraniums at a certain railroad station and eventually built a cottage there. The real estate agent knows this attractive value of flowers, nor is it one we would disregard.

But flower gardens and grassy slopes by the roadside are the natural sequence of the completion of a firm, clean road-bed, and a smooth, straight track. The railroad man's pride in a good piece of work is not content until it becomes comely and shows

"The excellence \* \* \* and best power  
Both of the object seen and eye that sees."

All this follows because he is not a mere machine for moving freight. Even the little flower-bed at the station plainly shows that the man there is not

"To the moods  
Of time and season, to the moral power,  
The affections and the spirit of the place  
Insensible."

Simply because it is always human and humane, and just



now very fashionable, to love flowers, we urge every station-master to bestir himself and find what he can do to beautify his station. There is a pleasure in it that will sweeten monotonous work, and make life there a little more interesting. Many a station-master has a dull time of it, and many



Golden Feverfew.

hours that a little thing of interest would make brighter. Try flowers.

## HOW TO BEGIN.

It is better to begin with what gardeners call "soft stuff," rather than with hardy plants. Seeds are cheaper than plants, but not when time and security are considered. Bedding plants are now sold at low rates, and are preferable to seeds. Select your spot and the size of your bed or beds, and spade the ground well, working into it plenty of well-rotted manure. Of course, if you can get a few loads of good soil, they will be an advantage over the gravelly ground you may be obliged to build upon. But whatever you use as soil, break it up well, and enrich it with short, well-rotted manure. Try to secure 18 inches in depth throughout the entire bed of soft, well-worked, fertile earth.

## DUTCH BULBS.

If you desire flowers in the early spring, your bed should be put in readiness at once. Hyacinths and tulips, the only bulbs that are, perhaps, worth your attention at the start, should, in the latitude of New York, be in the ground before Nov. 10, or 20 at the latest, and east and west of New York rather earlier. The bulbs should be planted in a soft, well enriched soil, 3 in. underneath and below the surface, which should be covered to the thickness of 4 or 5 in. with leaves or long manure. The object of placing this covering on the surface of the soil is to prevent the repeated thawing and freezing of the bulbs, for it is the former and not the latter that kills them. This covering should be removed in the early spring as soon as the plant shows its head above the soil.

Tulips are a little later than hyacinths, and a bed of both will show flowers for nearly two months. In Northern New Jersey they begin to bloom about the middle of April.

The cheaper bulbs are the mixed shades. The tulips appear better in rows or circles, with hyacinths in the centre. The red or the crimson Duc Van Thol tulip makes a beautiful border or even centre bed.

## Prices of Tulips and Hyacinths.

Tulips, mixed single varieties.....	\$1.00 per 100
" Duc Van Thol, red .....	1.25 "
" " yellow .....	3.00 "
Hyacinths, all shades, mixed.....	3.50 "

A bed 8 ft. in diameter requires about 150 tulips and 75 hyacinths, or, if tulips alone are planted, 250 bulbs; but



Coleus.

they may be planted closer than this estimate allows. When the season for Dutch bulbs is over, the season for spring planting has just arrived.

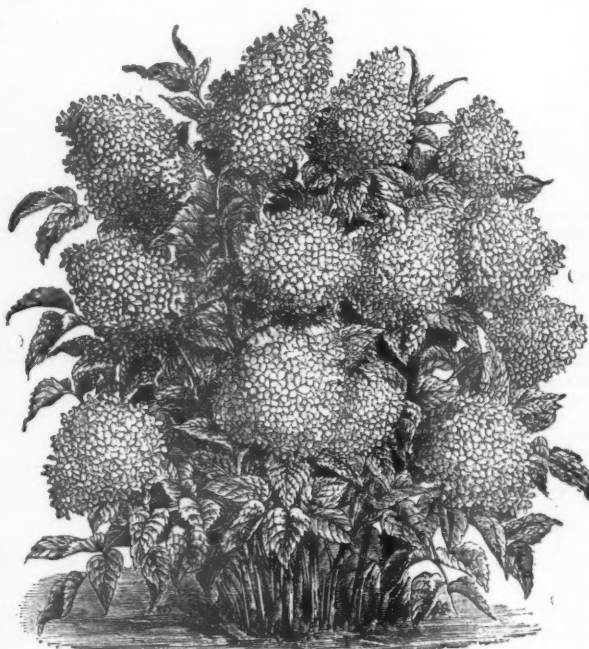
## BEDDING PLANTS.

It is early to speak of next year's beds, and yet not too early. The ground may be surveyed and dug out, catalogues

sent for and studied, and plans laid for the spring work. *The Garden*, a horticultural periodical published at 751 Broadway, will give special attention to this subject, and its articles may be studied. But we also have some advice to offer.

There are many plants that may be entirely overlooked or avoided without loss, but there are others peculiarly adapted to station flower beds. Among these are Geraniums, Salvias, Petunias; for borders, Ageratum; and for ornamental foliage, Coleus and Cannas. This list is short and simple, but we shall not add to it, for it is best not to fog the attention with a list of mere names. The important question is, how shall one use even so simple a list?

It is a common and not unwise selection, to choose geraniums when choice is limited to one flower. A bed of the scarlet geranium, General Grant, is brilliant and cheerful. Petunias are better in a bed by themselves; they are too irregular in their growth to go with other flowers. Cannas, with their long graceful leaves, are admirably adapted to be centre pieces. A good arrangement would be five red Cannas, and about these a ring of green Cannas, then Salvias, then Coleus, then Geraniums, and as a border golden Feverfew or blue Ageratum (Cope's gem). There is a red and a yellow variety of Coleus, and these may be mixed or either chosen, but it is important to remember that the yellow variety does not grow so tall, and must not be placed behind a stalwart plant than itself. Cannas should be planted at least 18 in. apart; geraniums and salvias 10 in. With the exception of roses, which may be placed on the calendar for May 1, a general rule may be given that no plants should be put in the ground before May 20, the season in Northern New Jersey being taken as a standard; and it is well to delay with the coleus until June 1. Seeds, however, may be planted from the middle of April to the 10th of May, as the spring weather is prompt or tardy.



Hydrangea paniculata granulosa.

## LETTERS AND VINES.

All this is very simple, as all lessons for beginners should be, and, to make it more interesting, we may take up lettering and vine culture before going into more details about beds. It is hardly necessary to say that a good lawn or grassy slope can only be promptly secured by sodding, and that the sod must be well watered and should get a light top dressing of well rotted short manure. The soil may be prepared and lawn grass sown, but this method requires foresight and patience.

Those who desire to put the name of the station in growing words upon its grassy slopes, may use Alternantheras, crimson or yellow, or Echeveria. Coleus are sometimes used but require constant trimming.

Of course, beds of proper and perfect shape must be set in the sod and well prepared for the plants.

As an ornament to the side of a stone or brick wall, or upon a rock or a pile of them, there is nothing better than the "Japan ivy," Ampelopsis veitchii. It is hardy, even in exposed places, and clings tenaciously. The Pennsylvania Railroad purchased 5,000 plants to cover the sides of cuts between Newark and Jersey City. Honeysuckles, the English ivy and wistarias only need mention, and to them may be added the Akebia quinata, a Japan twining plant with rich, dark green foliage.

Maurandia and Thunbergia may be raised from seed or be obtained as plants. They are adapted only to warm situations, and are not hardy plants. There is no more beautiful and graceful method of station decoration than that afforded by a skillful use of vines.

## HARDY SHRUBS AND A FEW ROSES.

There are many situations where a few shrubs will add greatly to the effect of a bed of flowers. Among the best of these is the Hydrangea paniculata grandiflora, which grows to 5 or 7 ft. in height. Its flowers are in large white trusses 9 in. in length. The Forsythia verdissima, with its early and brilliant yellow flowers, is also to be recommended.

\*Single not double flowers.

as are also the Altheas, the Dentzias and the Weigelas, and especially the Tritoma grandiflora or the red-hot poker plant. There is a new variety with spikes of flowers nearly a foot in length.

For roses, we may recommend the hybrid perpetuals and especially the rich crimson "General Jac" (quemnot); the brilliant crimson, Chas. Lefebvre; the dark vivid crimson,



Ageratum.

General Washington, and the double white rose, Mme. Planter.

## FLOWERS, SEEDS AND GOOD TASTE.

We may now add to our list of plants, Zinnias, Phloxes, Pansies and Marigolds. These may all be raised from the seed if necessary, and as seed's the pretty Sweet-pea, our native Correpis, the Balsams and Poppies will usually be planted. To the list should also be added the gladiolas, and for field flowers asters and chrysanthemums. With them we must secure some knowledge and taste, in order to produce a strong and pleasing effect. We know, however, one station agent who made a pretty bed this summer at an expense of 40 cents for flower seeds.

"Five years ago," writes an amateur, "I started my first flower garden, and have never been without one since."

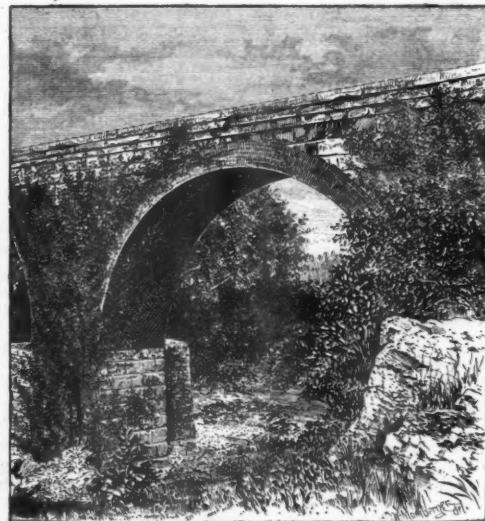
"I saw an advertisement in one of our weekly papers of twenty packages of flower seeds, the seedman's selection, for fifty cents. I sent for them, and was well pleased with the list, which was as follows: Single petunia, convolvulus major, nasturtium, aquilegia, balsam, coreopsis, silene, summer chrysanthemum, crepis, four-o'clock, larkspur, African marigold, French marigold, calendula, pink dianthus, sweet-William, campanula, portulacca, hibiscus and aster. I hired a man to make a flower-bed. It was to be round and about 10 ft. in diameter. After taking off the sod, which he placed around the edge, he dug it to the depth of 2 ft., working the soil over until it became light and fine; and here let me tell beginners that this is essential. Then he enriched it highly with thoroughly decayed manure taken from a heap that had been rotting for nearly a year.

A few weeks later, when the manure had been well raked in, it was ready for planting. I sowed my seed the last day of April. The weather was rather dry, but I dared not wait longer for rain, for fear it would be too late; so I watered freely, stirring it into the dry sand with a stick until it became thick, like pudding. Then, covering the seed lightly and pressing down the soil with my hands so as to retain the moisture, I watered again. I have tried this plan in dry weather many times since and have always been successful.

"In the course of a week the plants all came up so thickly that later on I had to thin out and transplant them. Then came a wet spell, and they grew so fast that by June many of the plants were a foot high, and by July they were in full bloom. The garden was a blaze of color, dazzling to behold, and attracted so much attention that people passing in carriages would stop to admire."

"Though most of the flowers were but common annuals which will grow in almost any garden soil, there was not another garden in the whole town which could rival it in beauty. I had sown the seeds of the taller varieties, such as larkspur, coreopsis and convolvulus major, in the centre of the bed, while around the edges I put those of the low-growing plants, as portulacca, dianthus and crepis."

We are greatly indebted for advice in the preparation of this to Mr. Marcus L. Force, of Convent Station, New Jersey, and Messrs. Peter Henderson & Co. New York.

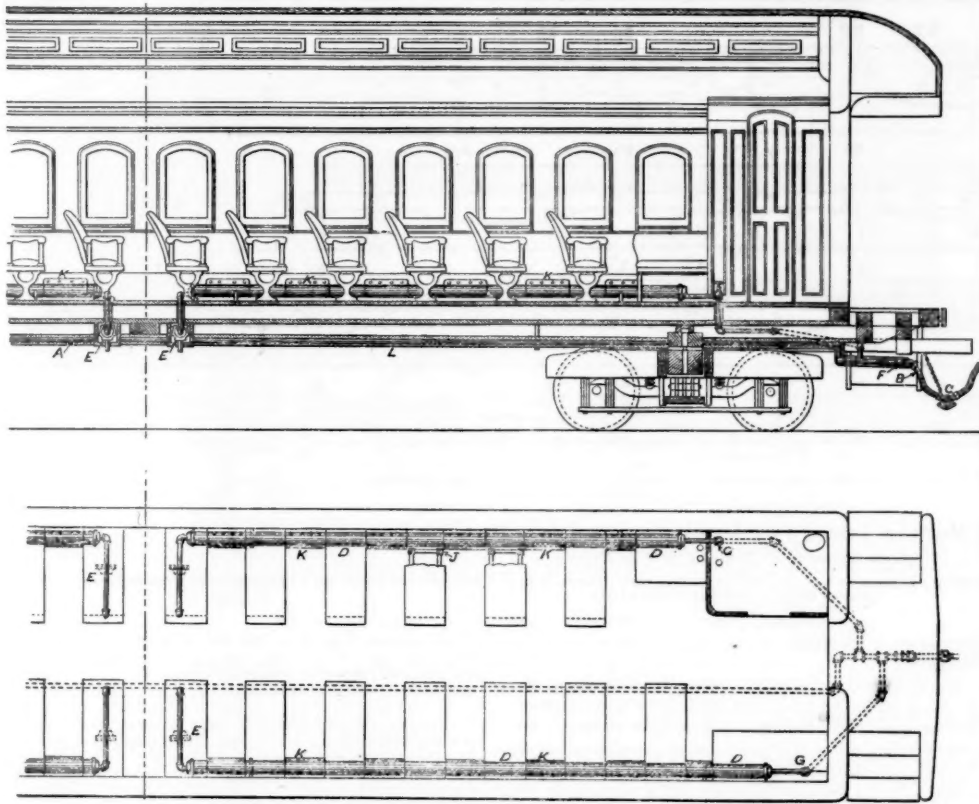


Ampelopsis Veitchii.

## Prices.

	Per 100.
Ampelopsis Veitchii.....	\$6.00 to \$20.00
Alyssums. Double, single, dwarf and variegated..	4.00 to 6.00
Alternanthera (Parychoides Major). The rainbow plant.....	6.00
Alternanthera. Aurea Nana. The finest yellow ..	4.00 to 6.00
6 other varieties.....	4.00 to 6.00





THE GOLD SYSTEM OF HEATING CARS—LONG ISLAND RAILROAD.

Ageratum. "Cope's Gem." Best blue.....	4.00 to	6.00
" " "White Cap." Best white.....	4.00 to	6.00
Achyranthus. Crimson, yellow, etc.....	4.00 to	6.00
Cannas. Large, tropical foliage; light and dark.....	6.00 to	10.00
Coleus. Verschaffelti. Crimson.....	4.00 to	6.00
" Golden Bedder. Yellow.....	4.00 to	6.00
" Hero. Black.....	4.00 to	6.00
Ech. verif. Secunda, Californica, Rosacea, Retusa, Sec. (lauci), etc.....	6.00 to	10.00
Feverfew.....	6.00 to	10.00
Geranium. Gen. Grant. Best single; scarlet.....	6.00 to	10.00
" Double Gen. Grant. Best double; scarlet.....	6.00 to	10.00
" Mt. Snow. Best silver-leaved.....	10.00	
Pansies. Finest mixed.....	\$4.00 to	\$6.00
Petunias.....	6.00 to	8.00
" single.....	4.00 to	6.00
Salvias. Scarlet, white, maroon and striped.....	4.00 to	6.00
Zinnias.....	to	6.00

These prices are wholesale, and intended only as a basis for general estimates. They cannot be regarded exact, as they vary with season and supply.

#### The Gold System of Heating Cars.

The accompanying engraving shows the Gold system of continuous steam heating, as applied to cars on the Long Island Railroad. This system of heating has been in use on the Manhattan Elevated railroads in New York for some years, and the principle of storing heat in a reservoir of salt water in the car is well known.\*

It is obviously very important that the temperature of the car should not fall when it is detached from the engine, and some tests on this point are interesting and show the efficiency of the device adopted by Mr. Gold.

The accompanying table shows the result of tests made on a Long Island car, showing how long the storage heaters will maintain the temperature of the car after steam is shut off. In this case the car was equipped with four 5 in. heaters 20 ft. long. A large supply pipe under the car supplied each heater with steam, and at the opposite end of cylinder a steam trap was placed; in this way all the heaters were perfectly dry. All of them were filled with steam from the supply pipe at the same time. This insures the car heating up very rapidly. The ventilators in the cars were open during these tests, which were made in presence of Mr. Varder, Assistant Purchasing Agent Baltimore, & Ohio; Mr. Geo. Griggs, Supt. of Motive Power Central of New Jersey; and Mr. Thompson, Supt. of Motive Power Long Island.

LONG ISLAND RAILROAD CAR NO. 190. TEST MADE ON OCT. 11, 1887. Steam turned on at 2:15 P. M. Steam turned off at 2:45 P. M. 45 pounds pressure.

Time.	Temperature, Fahrenheit.		
	Car at ceiling.	Car at window.	Atmospheric outside.
Degrees.	Degrees.	Degrees.	Degrees.
2:15.....	57	57	57
2:45.....	76	74½	51
4:15.....	76	75	51
4:30.....	76	75	52
4:45.....	75	75	52
5:00.....	73	73	52
5:15.....	73	73	52
5:30.....	73	73	52
5:45.....	73	73	52
6:00.....	73	72	52

The accompanying explanation of the figures of reference will make clear the arrangement of the apparatus as shown in the engraving.

A 1½ in. main steam supply pipe.

B Steam hose connection.

C Interchangeable couplings.

\* The Gold system of heating was illustrated and described in the Railroad Gazette, Nov. 12, 1886. The coupling was illustrated in detail in the issue of June 17, 1887.

D 5 in. diameter storage heaters, three 20 ft. long each and one 17 ft. long.

E No. 4 steam traps.

F Special steam stop cocks.

G 1 in. combination angle and check valves.

H Thermometer.

J Stands for foot rests.

K Shields to protect feet from hot pipes.

L Asbestos paper, hair felt 1 in. thick, and best Montana duck neatly sewn on.

#### New England Railroad Club.

##### CAR HEATING BY STEAM FROM LOCOMOTIVE.

The regular meeting of this Club was held in Boston, Oct. 12. President Lauder occupied the chair, and announced as the subject for discussion, "The Heating of Railroad Cars, and Legislation upon that Subject." He said this was a wide question; \* \* he would like to see the question of legislation in railroad matters generally discussed, because it is a well-known fact that every legislature in Massachusetts is pretty apt to pass some arbitrary law, often as arbitrary and unreasonable as the present law in regard to heating.

Mr. PENNYCUICK exhibited a coupling for steam pipe between cars, and said of it: This coupler is wholly new, being entirely automatic. We adopt a system of ventilation which no other heating device has considered at all. Part of my system is a trap—through which you cannot blow a match out, so there is no perceptible draught—to be used in connection with the steam pipes, so that the air is warmed as it enters the car. The basis of our heat is hot water, the water being heated by a new method. Mr. Pennyquick then explained the working of his system, and pointed out the peculiarities of the coupling, which, however, cannot be described without a drawing.

The PRESIDENT: The admission that the gentleman has made that there is wear in the ball and socket joint I think is fatal to this kind of coupling, for the reason that the couplings have to be changed from one car to another, and in such changes the difference in the amount of wear between one and another would make trouble. I don't believe you can use a metallic coupling and make it a success.

Mr. ADAMS: Suppose you take a car off from the train, and put it on a siding, how do you prevent the pipes from freezing in cold weather?

Mr. PENNYCUICK: By a preparation in the water; or, if necessary, the pipes can be emptied in a few minutes.

Mr. ADAMS: The great trouble with all the heaters that I have known of is the freezing of the water in the pipes in winter. Some people claim that salt water will not freeze; but it will freeze here.

Mr. PENNYCUICK: We take very little steam from the engine; nothing in comparison with what other systems require.

The PRESIDENT: You cannot get something out of nothing. Now, to heat 10 or 12 cars from the locomotive you have got to take a certain amount of heat to do it, whether you use steam or water. I cannot see any great advantage in heating by hot water over steam, in an economic point of view. You have got to use so much heat either way to produce the result. \* \* We are putting the Johnson heater into our cars.

Mr. CHASE exhibited the Mason reducing valve, and said: This valve is especially for railroad work. It is sometimes inconvenient for an engineer to take the wheel of a reducing valve and gradually reduce the pressure, to keep looking at it and adjusting it until he gets the pressure he wants. This valve is made with a lever instead of a wheel, by means of which he can instantly set it to any pressure he wants, can instantly change it, and can tell at any moment just what the pressure is. We have a little dashpot attached to the valve, which fills either with steam or condensation, prevents all chattering or pounding, and requires no attention. The area of the passage from the high to the low pressure side of the valve is equal, when open, to the full area of the pipe.

Mr. CURTIS exhibited the Curtis pressure regulator and said: It has been in use about four years on the Martin system of car heating. Mr. Martin adopted it when he began his experiments, and has some 200 now in use. We regulate the pressure by turning a handle, a lock-nut being provided which holds it in its place against any jar of the locomotive.

The engineer, by simply turning the handle one way or the other, gets a high or low pressure, and just the amount he wants—on the one side, 5, 10 or 15 pounds, or on the other, 40 or 50, as he may desire. The valve is very simple, has been tested many years on many railroads, besides in thousands of cases of other kinds of heating. We have all sizes.

In car heating there should be a trap in each car to separate the water and allow the steam to do its work. It would not be a very extravagant idea to take the exhaust steam from the blast nozzle of the locomotive and make use of it for heating. You have there a pressure of five to 25 lbs. constantly when your engine is in motion, which could be used, I think, with very little reduction of the blast pressure. You are producing 200 or 300 horse-power of steam there; allowing ¾ horse-power for heating a car, you would require 9 horse-power for twelve cars, and in taking that amount from 250 or 300 you reduce the pressure on that nozzle one-tenth of 1 per cent., which perhaps is immaterial.

I had some experience with Mr. Martin at Dunkirk, four years ago, with traps and found if there was a small outlet it would freeze, and if we had any outlet it would freeze some time or other. The trap I have devised is one with two outlets. The Pennsylvania Road has tested it thoroughly with salt and ice, keeping the trap at one degree above zero for a long time, and passing water through it by means of condensing steam through a coil. It is now in use on that road, and on the Boston & Providence and others. As there is no chance to produce a vacuum in this trap, on account of the two outlets, which are both operated by temperature, the water will not freeze in it. We can set it so that the outlets will open or close at a temperature of 180°, 212° or 300°.

Mr. CURTIS also exhibited an automatic coupling, and said: It is in two pieces, both halves being exactly alike. There is an arrangement for taking up the wear almost indefinitely, but the wear is almost nothing. This coupling consists of the ordinary nipple for rubber hose, with a ground face or joint, and three strong lugs or clamps to draw the faces together. When drawn together by the levers, they make a steam-tight joint. On each lever is an eye, to which is attached a chain, to connect with each car, the chain being shorter than the connecting hose, so that it draws the fluted surfaces past one another and disconnects the coupling before the strain comes upon the hose. The arrangement is light, very cheap and entirely automatic. I have no faith in a metallic connection. I believe that a hose of this kind will last four or five years with the low pressure which would be used for heating cars. I know such hose is used in tunnels and various other places under very high pressure, but in this case the pressure will be low.

Mr. SHINN: When the idea of heating by steam from the locomotive became prominent, in consideration of the fact that there are 7,000 heaters in use, I endeavored to utilize the existing apparatus. The plan that I adopted was that of injecting live steam into the water circulation. The steam was conveyed under the car, by a single pipe, a reducing valve being used and a branch pipe taking the steam at about the centre of the car. In a car fitted with the ordinary Baker system, with the temperature at 16 degrees outside, the car doors open and a violent wind blowing through, the water could, with 40 lbs. steam pressure, be heated to 212 degrees in about eight minutes, and this could be maintained with about 5 lbs. pressure. I have had one car fitted for experimental purposes. The experiment tried at 16 degrees was in February last, in the shops, not on a train, but with the same amount of pipe and under the same conditions as if it were. The hot water can also be utilized for supplying the wash basins in the car. The device is patented, and is in possession of the New York City Car Heating & Lighting Co., who will probably apply it before long.

Mr. SEWALL: In one of our experiments we coupled together twelve passenger coaches, with an engine that was capable of taking but eight, and making time. We ran 120 miles, with the thermometer about zero, against a strong northeast wind, blowing probably 40 miles an hour; the train was heavy, and the engineer could not make time; but at no time did he discover that the heater was taxing the engine in the least, or was detrimental to her power in any way. We have perfect control of the heat in each car; we regulated it so that each car indicated 70 to 72 degrees. We wasted steam enough to have successfully heated three or four more cars. In practice an engine would take care of the heating of all the cars that she can haul and make her time. We had no means of measuring the amount of steam used.

Mr. COGHLIN: A great deal more steam is used for heating cars when they are in motion than when they are standing still; more is used than is generally supposed.

Mr. CURTIS: A simple way of ascertaining the quantity would be to measure the amount of water condensed.

Mr. COGHLIN: That method is not always reliable, because water sometimes remains in the bottom of the coupling and between the coupling and the trap.

The PRESIDENT: In this matter of the capacity of the locomotive to heat trains, I suppose it will be admitted that the heating of the train from the locomotive will decrease its power under certain circumstances. For instance, if the engine is exerting itself to its full capacity to draw the train—and that capacity is its capacity to make steam—it certainly cannot pull that train and heat the cars. Fortunately most trains are lighter in winter than in summer, and there is a surplus of power that can be made available for heating the cars. But as a rule our engines have but little surplus. Now we have discussed this question pretty thoroughly; the other part of the question is that of legislation.

Mr. Lauder then read the Massachusetts law on car heating, and referred also to the New York and New Hampshire laws. He added: I will leave the discussion to others. Any railroad running a private car with a cooking stove in it is subject to a fine of \$500. The President of the Old Colony asked me for my definition of a "common stove." My definition is, any stove that depends for its action on the radiation of heat from its own surface. I suppose the object of the Legislature was to provide safeguards against fire.

Mr. ADAMS: It seems to me there is enough steam wasted at the whistle and safety-valve to warm the train. We don't blow our whistles more than a third as much as we did three or four years ago, and I think we might do away with the other third. Mr. Coghlin wants to find out just how much steam is used in heating. Now, I understand that this can be scientifically determined, but I am not a scientific man, and I get my ideas from practical observation. If we cannot tell the difference in the amount of fuel used in hauling seven cars between here and Springfield, and the engineer and fireman cannot see that there has any steam been lost in the heating of the cars, we don't lose a great deal. It may be necessary to go into this question scientifically and measure the amount of steam used very carefully, but if there is no apparent difference in the amount used now from what there was before the cars were so heated, I don't think it a matter of great moment. I don't hear that our engineers take any more coal than before. If we could perceive that we lost a ton or two of coal a day it would be worth while to consider the matter. If the engineers had to handle a good deal more coal for this purpose it would be for their interest to find fault with it, but they don't; they all like it and think it is the best thing they ever had. The passengers invariably say it is the best heat we have ever had in the cars. There is some little drawback to everything. We were pretty well satisfied with the Baker and Johnson heaters, but they heat the



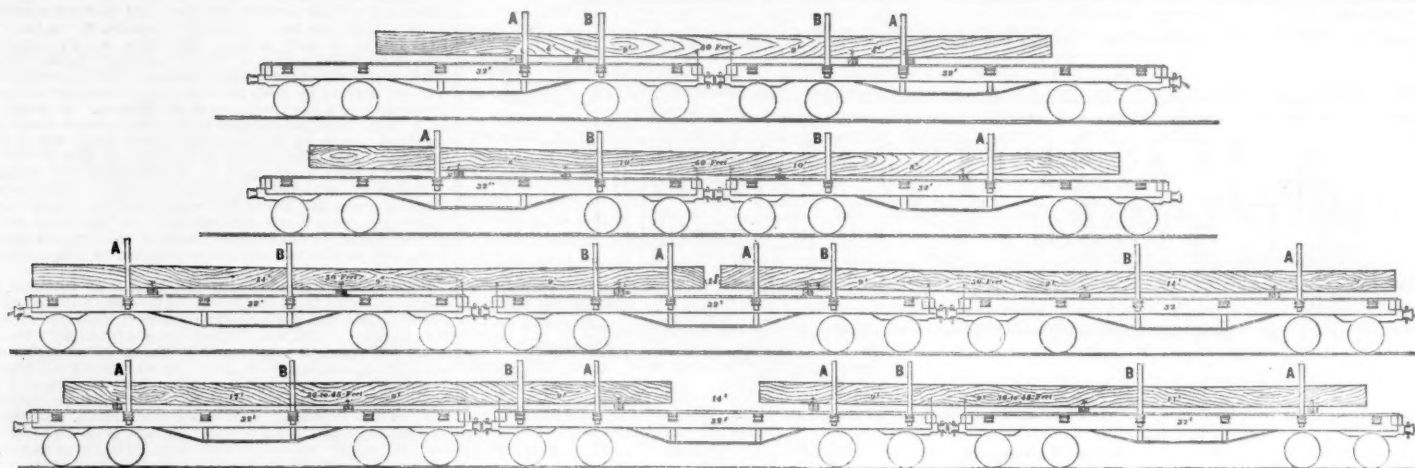


Diagram Showing the Manner of Loading Long Lumber Requiring Two or More Cars for Support.

From Louisville &amp; Nashville Book of Rules.

Figures followed by the word "Feet" show the length of the timbers. Figures on side sills show length of cars. Dimensions in feet given elsewhere show distances between transverse supports or between these supports and ends of cars.

cars too much in the spring and fall when we want but little heat. It is not so with steam from the engine, for in using it we can regulate the temperature and make it just right. On the coldest day of last winter, when the thermometer indicated 25° below zero at Framingham, I went there to see what the effect was on the temperature of the cars (heated from the engine) and found that the mercury stood at 72° in each car, and the ventilators were all open, as they had been all the way from Springfield.

I think the recent law is very unreasonable in its requirement—not giving the railroads any time, practically, to make changes in their modes of heating. The legislators might say, if asked the question why they did not allow us more time, "We gave you from June till October to make the change; why didn't you do it?" If any railroad had taken off its cars to put in steam-heating apparatus last summer, there would have been a terrible howl raised. I don't think there was a road that had a car to spare from its regular business. When business slackened a little they began to make the necessary changes, but there has been very little time. It is only two or three weeks since all the roads coming into Boston were taxed to their fullest extent to accommodate the excursion business. I think every road is now doing its best to comply with the law, in the limited time allowed. The law will not allow us to make a fire in a stove, and we have 50 or 60 cars with nothing but stoves in them, and some other roads have more. Somebody will be cold, or else we shall have to render ourselves liable to a fine of \$500, not only once, but every time we make a fire in a stove. It may be said that we should have been there when this matter was before the Legislature, and protested against it. But nobody knew about this; it was sprung on us as a trap. I asked a member of the Legislature about it, and he didn't know such a law had been passed until he heard about it in our office; so it is pretty evident the thing was rushed through in a hurry. It is a very unfair piece of legislation.

The PRESIDENT: Our friends of the old Master Car-Builders' Club, in New York, have reorganized their club and renamed it. It is now the New York Railroad Club. They meet at the old place, 113 Liberty street, and the next meeting will be held on the 20th of this month, the subject for discussion being "Car Heating." Some of the members of this club ought to go there and meet with them occasionally. We frequently have one or more members of that club here with us, and we should return the compliment.

While state laws are all right there should be some national legislation to cover this matter. I am not a constitutional lawyer, but common sense would indicate that laws passed like the state car coupling law and these state car heating laws, where cars are used in interstate service, are clearly unconstitutional and of no earthly force whatever. I can conceive of New Hampshire passing a law on this subject that would exclude Massachusetts cars from that state, and of Massachusetts passing a law which would exclude New Hampshire cars. The acts we have just heard read are different in many ways; perhaps it would be impossible to construct a car that would comply with all of them. If the general government would pass some law applicable to all the railroads in the country, we should then know what to do.

Mr. ADAMS: It seems as if these legislative bodies were laboring under the impression that railroad companies will not do anything except what they are obliged to, nothing for the good of humanity but what they are forced to. I don't believe that; I believe railroad companies look out for their interests the same as other people do. It is not for their interest to have in use anything that will render them liable to damage. All practical men know the difficulties in making any important change. Our company moved in the heating question before there was any movement on the part of the legislatures; and we did this because we thought it was both more economical and more safe.

On motion of Mr. RICHARDS, it was voted that the subject for discussion at the next meeting be, "Material for Axes, Journal Bearings and Lubrication."

#### The Louisville & Nashville Code of Rules.

The uniform code has been finally settled upon and is ready for use; many roads have already put it in force more or less completely, and others are still dealing with it. In adapting it to an individual road more or less revision becomes necessary, for the purposes of making the transition from old customs safe and easy, and of providing for the points which the committee left unsettled, or were obliged to embody in language not suitable for a manual of instruction. This makes it a matter of interest to know what treatment the best roads give to the code when they adopt it. The task of filling in the blanks in the important rules, and of putting into a form readily intelligible to learners those portions which the committee, because talking to teachers, had to leave incomplete, is by no means an easy one to be thrown off in an odd hour, and, therefore, busy superintendents will be glad to avail

themselves of the results of what has been done in this line by others.

The Louisville & Nashville, whose general manager, Mr. J. T. Harahan, has been a prominent member of the committee, has issued its revised code, and we give herewith some extracts from it which will convey some idea of the whole. The adoption of the uniform rules necessitates the revision of the whole code of a road, for there are few, if any, roads which can take out a portion of their old code, insert the new in its place, and still leave everything in proper shape. The portion thrown aside will include subjects which must still be provided for in some part of the manual, and the old rules retained will be found to cover topics which have been fully treated in the committee's rules and so must be expunged.

Mr. Harahan's manual is very full, giving explicit instructions on many points which are generally left to be treated otherwise; in fact this fullness and attention to particulars constitute its distinguishing feature, and it is for this, largely, that we make this reference to the work. The substance and arrangement are by no means free from defects, and this particular code should not be taken as an ideal one. Many of the rules (outside the standard portion) are evidently taken bodily from a former issue the pronoun "they" appearing in numerous places where it had better have been got rid of, and an occasional sentence being positively bad in its construction. Various specified derelictions "will be severely dealt with," while others which demand equal strictness are left without the support of this threat. In other places men are told that they "should" do so and so, where "must" is the proper word. But it is the good points of this code, and not the weak ones, that we wish to call attention to, and we present them without further comment.

22. \* \* Odd numbers are given to south-bound trains, and even to north-bound.

Rule 32 is inserted in the standard form, followed by 32 (a). Trains must not pass danger signals displayed by foremen of repairs or others, until they are removed, no matter upon which side of the track they are placed.

Rules 85 and 86 are printed in the standard form, but the time-table has the following:

At all schedule meeting stations and at meeting stations made by time orders for trains of the same class, the train having the right of track will, if the train to be met has not arrived, wait 3 minutes beyond its schedule leaving time, or the time stated by the order, and will then proceed, keeping 3 minutes behind its schedule time, until the expected train is met.

In Rule 86 inferior trains must keep ten minutes clear of following superior trains (R. & D. 5 minutes). Rules 88 and 89 require ten minutes interval (R. & D. five).

The blanks in Rule 96 are filled so as to read three minutes; half a mile; two minutes (R. & D. one). In Rule 97 the words inserted are: ten minutes (R. & D. three); half a mile; 50 ft. (R. & D. 450); half a mile; 2,700 ft.

The essential portions of Rule 99 are as follows:

99. When a train is stopped by an accident or obstruction, the flagman must immediately go back with danger signals to stop any train moving in the same direction. If on a level grade and straight line, with a clear and unobstructed view of the track for at least a mile, he must go back by day a distance of not less than eight telegraph poles, or 1,440 ft.; and at night, under similar circumstances, not less than sixteen telegraph poles, or 2,880 ft.

When going up grade, on a straight line, where there is a clear and unobstructed view of the track for at least a mile, he must go back a distance of six telegraph poles, or 1,100 ft. by day, and ten telegraph poles, or 1,800 ft. at night.

When going down grade, on a straight line, where there is a clear and unobstructed view of the track for at least a mile, he must go back a distance of fifteen telegraph poles, or 2,700 ft. by day, and twenty telegraph poles, or 3,600 ft. at night.

When on a curve, going up grade, he must go back a distance of ten telegraph poles, or 1,800 feet by day, and fifteen telegraph poles, or 2,700 feet at night, and as much further as is necessary to get clear around the curve on a straight line by day or night.

When on a curve, going down grade, he must go back a distance of twenty-five telegraph poles, or 4,500 ft. by day, and thirty-five telegraph poles, or 6,300 ft. at night, and as much further as is necessary to get clear around the curve on a straight line by day or night.

At a point eight telegraph poles, or 1,440 ft. from the rear of his train, he must place one torpedo on the rail; he must

then continue to go back the full distance prescribed in the foregoing part of this rule, being governed by the conditions named, and place two torpedoes on the rail 30 ft. apart (one rail length), when he may return to a point fifteen telegraph poles, or 2,700 ft. from the rear of his train, and he must remain there until recalled by the whistle of his engine; but if a passenger train is due within ten minutes he must remain until it arrives, unless such passenger train is delayed and he receives notice to that effect from his conductor, but in no case must he come in until recalled by the whistle of his engine.\*

\* \* \* When flagging at night, the flagman will, the last thing after being recalled, place one lighted fusee upright between the rails in addition to the two torpedoes.

99 (c). When a train, running on time, stops at a regular water station for that train between stations, the flagman must at once go back a distance of at least 50 feet from the rear of his train, and keep a sharp lookout for following trains.

When a train stops at a water-station, which is not a regular stopping place for that train, the flagman must be governed by Rules 96 to 99, inclusive.

99 (b). Except at water-stations, or in case of accident, trains must not be stopped on curves between stations; and in the latter instance only when the engine or cars are disabled in such a manner as to render it impossible to move the train onto straight track.

(The R. & D. code has Rule 99 strictly in accordance with the standard.)

In Rule 100 the distance prescribed is 1,800 ft. (R. & D., 3,600).

Following is Rule

110. A train must not display signals for a following train without an order from the Chief Train Dispatcher. If the line fails, or from any other cause such order cannot be procured, the yard-master, or other person in charge of the yard, is authorized, when there is more than one section of a train to be run, to have signals carried by each preceding section. The conductor and engineman of the preceding sections are required to fill and sign blank A in book Form 242. The conductor and engineman of each following section to fill and sign blank B, and to see that blank A has been properly filled and signed by conductor and engineman of the preceding section. After telegraphic communication is re-established the yard-master, or other person in charge of the yard, will at once notify the Chief Train Dispatcher what signals he has ordered carried, giving number of train and number of sections, and to what stations signals are carried.

110 (a). A light engine running as a section of a passenger train must always be run as the first section, and never, except in cases of great emergency, as a following section.

Rule 117 is rearranged as follows:

117. It is the duty of conductors to personally attend to the handling of switches at points where switchtenders are not employed. They may, however, permit competent brakemen to handle them in their presence. \* \* \*

117 (a). A train about to enter or leave a siding must come to a full stop before the switch is thrown, and no signal must be given to start the train until the switch is turned and the lock is secured through the hasp.

No attempt should be made to close a switch until the last wheels are off the switch rails. The person who locks a switch must grasp the chain and pull the lock to see that it is securely fastened, and, after having done so, must look twice at the switch rails to see that they are in their proper position.

117 (b). Running switches shall not be made.

Following the standard rules come 122 to 126 inclusive, rules for work trains. The hours for these trains are 4:30 a. m. to 8:30 p. m. They must deliver a report at each telegraph station: may in fair weather flag freights 30 minutes late, but in times of fog must clear all trains. If out after dark they are to receive a written identification card from every engineman passing.

Rule 127 concerns deportment; 128, ten paragraphs, is for masters of trains. One portion of this rule reads:

"They will examine conductors, enginemen and flagmen as to the rules, and must know that each understands those pertaining to his duties before permitting them to go on duty."

"They will see that none but intelligent and reliable white men are selected for flagmen. In cases of emergency they may permit conductors to select flagmen, but they must be examined as directed above, at the end of the trip, and must not be permitted to go on duty again until such examination shall have been made."

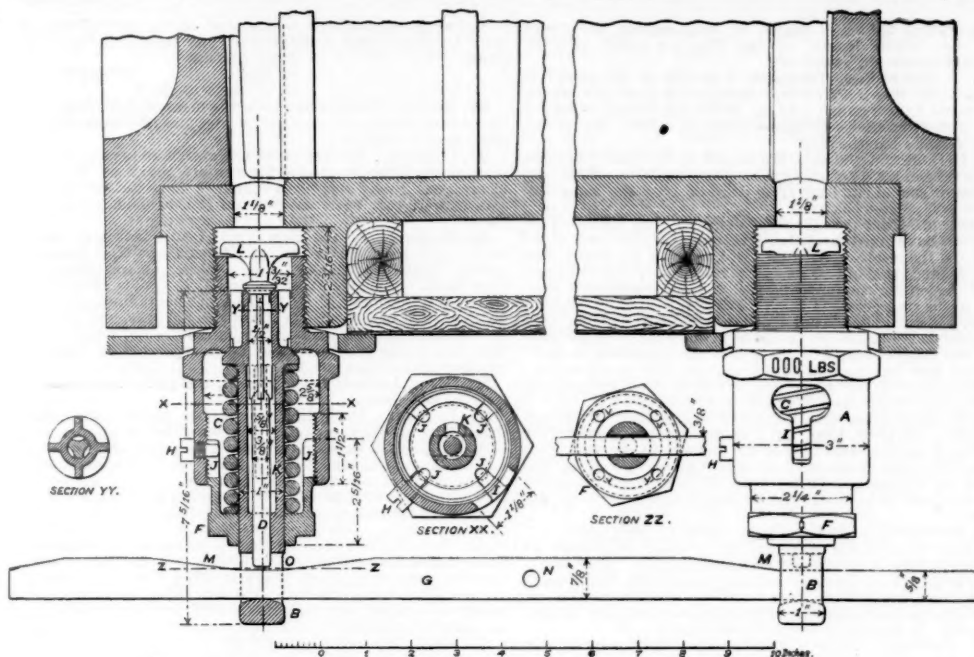
Rules 129-131 concern some duties of train and yard men and warn them in very clear and sensible terms about looking out for their own safety.

Numbers 132 to 179 inclusive, cover a great variety of the duties of "conductors, flagmen, brakemen and train porters;" they ought to be separated and classified instead of being lumped under a single head. They include very full and explicit instructions for conductors as to handling freight, the treatment of live-stock in accordance with the United States laws; and the handling of oil-tank cars. The law concerning ejection of passengers (which, by the way, is given for

\* "R. & D." here and elsewhere indicates reference to same point in the Richmond & Danville's code, which has been prepared by General Manager E. B. Thomas, also a member of the late committee.

\* In the original these words are in Roman, not italic; the italics here indicate the portion added by the L. & N.





COMBINED CYLINDER COCKS AND SPRING RELIEF VALVES

Florida, and for Illinois, between which states various differences exist) is intelligently summarized and minute directions for conductors in dealing with sleeping cars and their occupants are given. Among these rules are the following:

145. They (freight conductors) are held responsible for the proper care of the external parts of speed recorders placed in their cabooses; and should they become deranged they will report the fact promptly by telegraph to the Master of Trains.

Any employé showing a disposition to obstruct the working of a speed recorder will be dismissed from the service of the company.

150. \* \* \* A brakeman, when riding on the engine, must obey the engineer's instructions as to the proper time to return to his post.

Rules for train baggagemen and for enginemen follow, the latter containing a speed table calculated for quarter and half, as well as for whole miles. The instructions to yard masters, to trainmen concerning coupling sticks, and regarding uniforms are more full and carefully worded than generally is the case. Section men have clear and simple rules telling just how to repair telegraph wires; and there is a list showing trainmen the location of all the low overhead bridges. The station agent's rules are very full, especially concerning freight, though we see nothing about extra baggage. Among the freight rules is the following:

289. In loading lumber on two or more cars, the cross-pieces on which the lumber is to rest should be at least 6 in. thick and 8 in. wide, and be placed in accordance with diagram opposite (see illustration) the object being to distribute the weight, as near as practicable, equally on the different trucks, and permit the cars to curve as freely as possible.

Car inspectors and bridge supervisors are provided for, and a portion of the train dispatchers' rules and those for station agents concerning fixed signals are given, though the uniform train-order rules and the general regulations for the telegraph service are in a separate book.

#### Combined Cylinder Cocks and Spring Relief Valves.

In steam engines which have to be frequently reversed it is very common to use safety or spring relief valves on the cylinders in addition to the usual waste water cocks. The springs of these safety valves are so adjusted that while preventing the escape of steam at the usual pressure, they relieve the cylinders from any abnormal pressure caused by condensed water. A certain amount of water is carried in suspension from the boiler through the steam pipes into the cylinders, and in addition water will be produced in the cylinders themselves by condensation. Toward the end of the stroke, when the exhaust is closed and the contents of the cylinder are compressed, the water being incompressible, creates a considerable pressure in the cylinders. This water pressure in steam cylinders without safety valves is transferred to the driving boxes and other bearings, causing breakages of cylinders, cylinder heads, pistons, rods, crank-pins, etc., thereby causing delay in service.

Most forms of spring or safety relief cocks are, however, somewhat too complicated and expensive for use in small stationary engines or on locomotives. The accompanying engraving shows a simple form of combined cylinder cock and spring relief valve which has been designed by Mr. Walter Veilhaber, of Altoona, Pa.

The valves shown in the accompanying engraving are intended for locomotives and steamships where the water can escape directly from the valve chamber. In steamships, this water and other drainage will flow to the drain pipe or to the bottom of the engine room, from where it will be pumped overboard.

The valve casing *A* is provided on one end with outside threads and hexagon to screw it into the end of the cylinder and fitted with inside threads on the other end to receive nut *F* for adjusting the spring *C* of the safety valve *B*.

The safety valve *B* has a tubular stem extending through and below the chamber, and is apertured transversely outside of the chamber at *O*. This aperture serves as a guide for the sliding cam-bar *G* for raising the relief valve *D*, seated on the safety valve *B* and provided with a stem extending into the transverse aperture of the safety valve stem *B*.

The bar *L* being an extension of the relief valve *D*, prevents the latter from going down together with the safe-

valve *B*, thereby opening itself when the safety valve *B* is in operation.

The relief valve *D* will also be lifted by the vacuum in the cylinder when the engine is running down hill (throttle valve being shut) and allow air to enter on one side of the piston; the air on the other side of the piston will escape through the exhaust pipe.

The cam bar *G* is connected by a bolt *N* with a rigging leading close to the engineer's position in the cab of the locomotive, so that the runner can relieve the cylinder of water directly. The rigging is so arranged that it will allow the cam bar going down with the relief valves, and any rigging now in use for locomotives can be connected with the cam bar.

The set screw *H* and the slots *J* in nut *F* are intended to adjust spring *C* to a certain pressure. The hole *I* of the valve casing *A* will always engage with one of these slots *J*. Holes *V* are drilled in nut *F*, so that no water will remain in valve chamber to freeze in winter.

The safety valve stem *B* has a longitudinal aperture *K* about opposite the hole *I* of the valve casing *A*, so that the steam and hot water, escaping when the relief valve *D* is raised, is required to pass through the whole valve chamber. This will prevent the valve chamber from being plugged up with snow or ice in winter.

The nut *F* can be screwed up  $\frac{1}{2}$  in. further into the valve chamber as shown, so that the same spring can be used for locomotives of different boiler pressures, and the valve casing can be marked outside for the pressure intended.

The steel wire springs should be calculated and made so that the maximum strain per square inch, when the spring is solid, will not exceed 7,500 lbs., so that they will stand the pressure for the life time of an engine. Should the springs get a little weak after being in operation for some years, they can easily be adjusted again by the nut *F* without interfering with anything else. It is anticipated that the steel springs will be sufficiently greased by the tallow and oil flowing out of the cylinder to prevent rust.

Stud bolts and nuts instead of threads can be used for the large cylinders of marine engines.

#### The Roadmasters' Association of America.

##### FIFTH ANNUAL CONVENTION, CONTINUED.

At the opening of the afternoon session of the first day President Craig announced that he was ready for the reports of the various Committees. Some of them asked for and were granted further time to prepare reports.

Chairman Burnett, of the Committee on Standard Rail, reported that although his Committee had not expected to be called upon until later in the session, they had their report ready and would submit it. It was as follows:

##### STANDARD RAIL.

Your Committee appointed to make a report upon the weight, form and mechanical construction of railroad rails submit the following:

First: Weight of Rail.—While it seems desirable for the increased weight of engines and tonnage of cars, plus their additional weight, together with the increase of speed, to use more metal in the rail, thereby allowing a greater degree of hardness, inasmuch as this subject is at present receiving considerable attention in railroad circles as well as with the manufacturers of steel rails, your Committee is not prepared to say (for the quality of rails now manufactured) what its weight should be. However, we take pleasure in submitting for your consideration drawings and blue prints of rail sections, weights from 60 to 100 lbs. per yard.

Second: Form of Rail.—Your Committee recommend Nos. 4, 5 and 6 of accompanying blue prints. Your Committee further recommends that this association urge the importance of a standard section for all weights. Yet we fear the time has passed, if it ever existed, for bringing engineers and manufacturers to unite upon a standard section.

Third: Mechanical Construction.—This opens a volume of which we will touch but little. First. All the metal necessary to admit of hardening properties sufficient to resist the traffic. Second. Perfect rolls and well finished in line and surface. Third. Rail to be as high as possible without sacrificing other proportions, base equal to its height. It goes

without saying that the proper distribution of metal gives the greatest strength and durability.

(Signed)

J. BURNETT, Chairman.  
R. A. WILLIS,  
T. RAFFERTY,  
O. S. JORDAN,  
Committee.

The discussion was then opened.

RICHARD CAFFEY (Lehigh Valley Railroad): The Chairman of the Committee presents three rails having each a different radius on the upper corner where the flange and tread of the wheel meet. One has seven-sixteenths, one one-half an inch and one five-eighths of an inch, and the only question I should care to hear discussed is which is the best of these three forms. I think the radius of the upper corner of the rail, where the tread and the flange come together is nearer right at five-eighths of an inch than any other radius I know of. I favor it because it is about the radius of the wheels made in this country now. I think the Master Car-Builders have come to about that radius for the flange or tread of wheels. I think the flange and the rail at that point should fit closely together. If you have a sharper flange or rail you get the bearing in a very narrow space and the rail soon begins to cut away.

ISAAC BURNETT (Joliet Steel Co.): I think the Car-Builders have fixed upon a  $\frac{1}{2}$  in. radius for the fillet of the wheel, but you would recommend a change to  $\frac{5}{8}$  in.

Mr. CAFFEY: Yes, sir; I would recommend the change because it gives you more bearing. The object is to get as much flange wear as possible out of the rail. However, as you do not have a uniformity of wheels, I do not see that it makes much difference whether you have a uniformity of rails or not.

M. SHEA (Cincinnati, New Orleans & Texas Pacific): The increase of tonnage passing over our rails is an important consideration. Cars of 60,000 lbs. capacity are now passing over rails 50, 53 and 56 lbs. to the yard, and the rails are not in proportion to the tonnage, and this is a matter which we should impress upon our superiors, our general managers and superintendents, that the rails may be kept up with the tonnage passing over them. I do not think the radius of the rail is of much importance, so long as we have a good rail and a heavy rail. If we have a heavy rail we are safe and will have no broken rails.

Mr. COX: In increasing the rail in weight, height and base my idea, in using the many soft ties we do, is to have a large base for the rail. I think from 75 to 80 lbs. would be about the standard for our Western roads, and the capacity of the cars should be from 40 to 50,000 lbs.

O. S. JORDAN (Michigan Central): I hand you herewith a blue print of what I think should be the standard rail for our trunk lines. My idea is 75 or 70 lbs. We have used 50, 60 and now 65 lbs. to the yard with  $\frac{1}{2}$  in. radius. The rail kinks some; there is not much battering at the joint. We put 3 ties under the joint, yet I think they are not heavy enough for the traffic over the lines.

R. R. HOUGHTON (Wabash): I do not see how we can recommend the adoption of any particular weight of rail, yet we can adopt a certain radius for the manufacture of all weight of rail.

C. H. CORNELL (Chicago, Milwaukee & St. Paul): We are using a 50-lb. rail, and I have noticed that they could not tamp a heavy rail as well as a light one. We might get a heavy rail and a poor article and be worse off than with a light one.

Mr. SWARTZ: I think the heavy rail could be made better and the difficulty overcome.

Mr. DICKSON: I would recommend a rail 75 lbs. to the yard. My experience is: that the rail 60 lbs. to the yard is too light.

Mr. MCINARNA (New York, Pennsylvania & Ohio): I do not think so much depends upon the weight as the quality and how it is tempered. Of course, every road must adopt a rail in accordance with the tonnage passing over it. We have used 60 lbs. to the yard. We have had some breakages in winter, scarcely any in summer even with a hard road-bed. This year we have adopted a rail 78 $\frac{1}{2}$  lbs. to the yard, and these were so brittle that in unloading them from the car to the soft ground several of them broke. Now, such rails as those may wear well, but I do not consider them safe. Regarding weight, I think the most profitable rail is from 75 to 90 lbs. to the yard.

G. R. CAMPBELL (Ohio Central): We are using a 56-lb. rail, and it is all our road requires. On all roads we connect with, the Pan Handle, Baltimore & Ohio, etc., the 67-lb. rail is taking the lead. It is certain that a 50 or 56-lb. rail gives a little better satisfaction in regard to wear than the heavier rail. I cannot tell why, but suppose it is owing to the manner of putting it through the rolls and securing the right temperature.

H. A. BUEL (Chicago, Milwaukee & St. Paul): We are now using steel rail 67 lbs. to the yard. Our heavy rail is not giving good satisfaction, for the reason that the ball seems to be very soft.

Mr. PRESTON (Chicago, Rhode Island & Pacific): There are so many conditions upon which we have to depend, trains, the number of ties, the face of the tie, the distance between ties, the kind of ballast, and the roadbed complete below your rail. I think the 70-lb. rail is heavy enough for any of the roads at the present day. With a good roadbed, with 30-ton cars, and engines not heavier than 54 tons, the car, loaded, should not exceed 50 tons, and then with 70-lb. steel rails, a perfect angle-bar, ties 12 inches apart—and they should not be more than that—and you have a good track. With branches the rail might be lighter, as we should have our rail in proportion to the traffic over our roads. We should have 1,000 ties to the mile, that is, 17 to a 30 ft. rail.

S. L. SWINNEY: I think a 60-lb. rail is preferable; we have some excellent quality in our 50-lb. rail, but the extra weight of cars is doing it considerable damage, and for that reason I think it necessary to increase the weight of rail. The supporting strength of the rail is in its height mainly, but the height should not be increased more than the base. A rail 5 in. high should have a 5 in. base. The whole question of rail section should be decided according to the tonnage.

Mr. BURNETT: It is desirable to get as great a wheel base as possible. I think a 75-lb. rail, properly made, will stand any traffic we have in our Western country at least. I know nothing of the Eastern country.

J. W. CRAIG, the President (Charleston & Savannah): The question of tonnage must decide the weight of rail, and the next thing to consider is, are your cars the only cars to pass over that track? If so, it is easily settled. The relation of wheel to rail must regulate the amount of tonnage, and that is the problem engineers have been trying to solve for many years. And the amount of tonnage should decide what the area of contact should be. As you increase the area of contact—possibly I am wrong in the matter—you increase the friction and it takes more power to move your cars over the line. We cannot recommend a standard for every road, as the tonnage varies; at the same time we must report as to what is the best section of rail.

##### WEDNESDAY.

The discussion of Standard Rail was continued.

Mr. H. W. REED (Secretary Savannah, Florida & Western): Last evening this subject of "Standard Rail" ran off the track



at a bad joint, and in the wreck of ideas that occurred, little was said bearing on the report of the Committee. If there is reason for adopting a 50-lb. rail for a light traffic and moderate speed, does not the same reason exist for adopting a heavier rail for a heavier traffic and greater speed? Now, as to economy in expenditure. Last year one of my divisions was laid with 50-lb. steel rail; the following year it was laid with 60-lb. steel rail, made under the same specifications, and a carefully kept account showed an increased economy of maintenance in favor of the 60-lb. rail sufficient to cover the interest and deterioration on the additional 10 lbs., and to say that we have a better track is not even expressing the full benefit derived. Now, in view of divergent opinions and the desire that the report shall be sufficiently broad to cover the requirements of all railroads, I will offer the following substitute to that portion of the Committee's report under the head of weight:

**Weight.**—It is our experience that with first-class steel rail on our main trunk lines where the interchange of traffic necessitates the passage of a heavy tonnage and heavy locomotives at rapid rates of speed on well ballasted and well tied roads, nothing less than a 60-lb. rail is sufficient for the maintenance of a first-class track. On unballasted roads the weight of rail should be increased about 15 per cent. to make up for the absence of ballast, and on roads of lesser tonnage a rail of less weight to suit each special case, as determined by competent engineers and roadmasters, should be adopted.

I offer the following substitute for the Committee's report under the head of Form.

**Form.**—A section of the usual T pattern, made with a sufficient quantity of metal in the head to best resist wear, and so formed as to give the greatest strength and economy of material and the greatest bearing surface for both tread and flange, is in our judgment best.

I offer the following substitute for the Committee's report relative to the necessary mechanical structure and chemical composition of the rail, which is the last subject under the head of standard rail.

**Mechanical Structure.**—The rail should be perfectly straight, without mechanical flaws. It should contain as high a percentage of hardness as possible to give toughness, and, at the same time avoiding too great brittleness,—these qualities to be determined both by appropriate chemical and mechanical tests and by careful inspection.

The above substitutes were accepted by the Committee and adopted unanimously by the convention.

#### GUARD RAIL.

The Committee on Guard Rail reported as follows:

\*\*\* Your Committee have met, and after looking these sketches all over have come to the conclusion to throw them into the scrap heap. We will now come to the front with a sketch from Mr. Jno. P. Doon, of the Chicago & Western Indiana. It is a very neat sketch, and comes as near filling the bill as anything we have seen. You will observe that he has 10 ft. in front of the point of the frog, and 5 ft. back of the point; and running parallel with the main rail 4 ft., commencing 1 ft. back of the point of the frog, and running 3 ft. ahead of the frog point; then gradually curving to the ends of the rail, leaving the inside of the guard rail 4 in. from the main track rail, while Mr. Dickson, of the Pennsylvania Co., C. & P. Div., Wellsville, O., suggests an 18 ft. guard rail, with flange-way at point of frog 2 in., and gradually curving from the centre of rail to within 18 in. of each end of the rail; and from there he says turn the ends off on a sharp curve, and leave the ends of the guard rail 1 ft. from the main rail, which makes a very good and substantial guard rail, with one or more rail braces to hold it, as the case may require.

All of the members who were present at our last convention know that my (Mr. Campbell's) idea of a guard rail is a 15 ft. rail, regular quarter circle, for rigid frogs, commencing at and 6 inches ahead of the point of the frog, making the flange-way at that point 1½ in., and gradually curving each way to the end, which leaves the end of the rail 15 in. from the main rail. You will remember that it created quite a furor, and some said it was of no earthly account, while others said it was a "man-killer." I want to say that it has been in use for the last 25 years, and so far as I know no man was ever hurt by one of them, and I have the word of over 200 brakemen, pony conductors and yardmen that they are the best guard rails they ever did work over. They do all that is required of them; that is, they guard the point of frog, after which they are of an easy, gradual curve, no jerks and no strain on the wing rails of the frog, and instead of its being a "boot-jack," like this one and that one, etc., it gives the brakeman warning in time to get his foot out. However, I do not come here with the expectation of inducing this convention to recommend it as a standard guard rail; the effort, I (Mr. Campbell, who wrote the report) throw my ideas, together with the balance of your Committee, into the "scrap pile." Now we are virtually left without a guard rail. What shall we do?

Your Committee have decided to submit this as a standard guard rail for all kinds of frogs, especially for main tracks:

The guard rail shall be 15 ft. long, commencing 6 in. ahead of the point of the frog, and extending back 6 ft. and 6 in., which leaves 8 ft. and 6 in. ahead of the frog's point. This shall run parallel with the main rail 5 ft., commencing 1 ft. back of the point of the frog. The flange way for this distance shall not exceed 2 in., after which the rail shall curve gradually to its end, which shall have a space of 6 in. between the main rail and the ends of the guard rail—rail braces to be used as necessity requires—and why? Because the point of the frog is the only point to be guarded, and we are of the opinion that guard rails spiked down in this way will serve to level up the trucks before reaching the frog's point.

Your Committee has also seen proper to dispense with the filling between main and guard rails, and bolting through and through. We do not recommend a rail brace as the best, but from the fact that when a guard rail becomes worn on the inside it can be taken up, a piece of the base chipped off and again set up to its proper distance, thus giving it a much longer term of service. And in order to take stumbling blocks out of the track we recommend a rail brace made from ½ in. iron, 4 in. wide and 8 in. long, with three spike holes, the brace to fit into the neck of the rail tight. That kind of a rail brace weighs 5 lbs. each, while the old cast-iron brace weighs from 12 to 15 lbs. each.

GEO. A. CAMPBELL,  
F. A. DICKENS, JR., } Committee.  
J. A. PERRY,

The discussion was as follows:

G. E. CAIN (Wabash): I think that guard rail is proper in every form, except I would object to fastening it with a clamp.

MR. THURSTON (Chicago & Northwestern): Regarding the distance of the point of frog from the guard rail, I would prefer ¾ in., 6 in. between point of guard rail and the main rail, and have it come gradually up, as shown. I prefer a 15 ft. guard rail.

MR. A. D. ADAMS (Wabash): I see no objection to this guard rail. My idea is that a guard rail should be of regular width the whole length of the frog and 15 in. from the bend; that gives two inches opening, and it should have the

same opening the whole length of frog, making the guard rail the whole length of the frog, or about 16½ ft. straight opening or guard rail.

A. P. BLUE (East Tennessee, Virginia & Georgia): It seems to me that if 4 ft. 5 in. constitutes a defective wheel, we should have a gauge, and the guard rail should be gauged 4 ft. 5 in. from the point between flanges. With the exception of that I like the plan.

C. H. CORNELL (Chicago, Milwaukee & St. Paul): I do not think we can get a better form of guard rail than that, only I think it should run back from point of frog the same distance as it is from the head.

RICHARD CAFFEY (Lehigh Valley): The Master Car-Builders have fixed the distance between the inner rail of the frog and the inside of the guard rail, and we all know that that distance is about 53 in. That settled, it remains to consider the length, the form and the position to place it in relation to the frog point. I think a guard rail 15 ft. in length is right. It should be curved a distance of 2½ ft. from each end, the end of the guard rail to be about 4 in. from the main rail, the parallel length of the guard rail to the frog to be 10 ft., and that leaves a straight distance of 10 ft. in the middle. At the centre of the 10 ft. should extend from opposite the point of the frog, ahead of it 6 ft. and back of it 4 ft.

C. WARREN (Charlotte, Columbus & Augusta): My idea is to have a rail 18 ft. long, but I do not see the necessity of having it parallel with the track. After it passes the point of the frog I see no necessity at all for the guard rail on the inside of the track. All we should do is to guard the wheel past the point of the frog, and beyond that we have no use for it.

H. HUTCHINSON (Boston, New York & Providence): I would be in favor of a guard rail 15 ft. long, bent 2 ft. at each end in the proportion of 2 in. to each foot. That would leave a space 6 in. between the gauge side of the main track rail and the inside of the main track rail when in position.

MR. CRAIG (the President): My idea of a guard rail is that it should run the entire length of the track.

MR. CAFFEY: I offer as an amendment to the report that the guard rail, as proposed by the Committee, be recommended and that a cut of it showing the main rail and the guard rail appear as part of the proceedings of this meeting. Carried.

MR. HOUGHTON: I move as an amendment to the report that the guard rail be required to be of equal height with the main rail in all cases. Carried.

The report of the Committee on Guard Rail, as amended, was adopted unanimously.

#### STANDARD FROGS.

The Committee reported as follows:

We, the Committee appointed to prepare a report on Standard Frogs, beg leave to submit the following:

First. The rigid frog as being best adapted for general use. Length for main line, 12 ft.; angle, 1 to 9, and so proportioned as to have equal clearance distance at the heel and toe.

Second. The filling to be wrought iron, although we think malleable iron worthy of a trial. It should extend 8 in. beyond practical point, and back to where wing rails are bent, and be so shaped as to snugly fit on the base of rails.

Third. Bolted by from 6 to 8½ in. bolts. For yards we also recommend a rigid frog, location to determine angle and length.

P. NOLAN,  
JOHN SLOAN,  
F. X. CALARNEAUX, } Committee.

MR. MCINARNA (New York, Pennsylvania & Ohio): I regret that the Committee have recommended the rigid frog for general use. It has been clearly shown that the spring rail frogs are as safe in every way as the rigid frog, and that they will wear from 12 to 15 years, whereas the best rigid frog in use will wear only from 2 to 3 years. They have adopted the rigid frog which came in use when the first railroad was built in 1835. It would be as sensible to do away with the split switch and adopt the stub switch, equally on a par.

MR. DICKSON (C. & P.): I am sorry that such a frog should have been presented to this meeting, and I hope it will be voted down. I fully agree with Mr. McInarna that we do not wish to go back to the old system of 35 or 40 years ago, as it has been fully demonstrated that the spring rail frog is perfectly safe for any tonnage and any weight of cars and engines.

J. W. MOORE (Savannah, Florida & Western): I do not think the rigid frog should be accepted by this convention as a standard. At least I shall vote against it in favor of the spring rail frog.

MR. CORNELL (Chicago, Milwaukee & St. Paul): Two years ago in Chicago we settled this question, and I think our managers who let us come here would probably think we were boys changing our minds so often from one standard to another. If we adopt a standard we should stand by it.

MR. CRAIG (President): The adoption of a standard does not mean that you should follow it for life. It is adopted at the time as the best. We would like to know what is best in 1887. However, I think when we get through with the discussion of this question that the stiff frog will be nowhere in the race. (Laughter and cheers.)

MR. CORNELL: Why, gentlemen, we adopted the rigid frog in Chicago in 1885.

MR. CAIN: Well, the life of the rigid frog is two years. That is worn out and we are progressing. (Laughter.)

MR. DOYLE: I have seen nothing as good as the spring rail frog and split switch, and notice that many roads are adopting them.

MR. THOS. HICKEY (Michigan Central R. R.): I would recommend that spring rail frog as a standard for the main track, also that it be not less than 15 ft. in length; also that rigid frog be used on the side track only, and riveted on to the plate and be about 13 ft. long.

MR. M. SHEA (Cincinnati, New Orleans & Texas Pacific): My experience is that for safety the rigid frog is the best. The inner rails of the spring frogs generally break and get out of fix, and we have changed for that reason, our general managers not considering them safe.

MR. COX (Chicago, St. Paul & Manitoba): I should be in favor of the spring rail frog in any country that was not cold and snowy.

MR. CAFFEY: I have an amendment here to offer to the report of the Committee on Standard Frogs, which reads as follows:

"Resolved, That the report of the Committee on Standard Frogs be amended as follows, viz.: that it is the sense of this association that a frog having a proportion of one in ten is the best for a standard.

That the spring rail frog be recommended for main line use, where practical, and rigid frogs for use in yards, and that all frogs be made in the strongest and most substantial manner possible."

MR. CAFFEY's motion was seconded and carried, and the original report, as amended, was adopted by a standing vote; 34 ayes to 15 noes.

THURSDAY, OCT. 13.

#### STANDARD GUARD RULES FOR BRIDGES.

The report of the Committee was as follows:

Your Committee on Standard Guard Rails for Bridges and Re-railing Frogs at Bridges would respectfully report as follows: That the best standard guard rails for bridges and

re-railing frogs at bridges we know of at the present time is the "Latimer-Childs Combination," as shown on the diagram.

JOHN DOYLE,  
M. SHEA,  
M. J. MCINARNA, } Committee.

MR. DOYLE: I believe this to be the most perfect guard for the ends of bridges yet devised, if not for the most perfect protection of bridges.

MR. PRESTON: We find it, as the chairman says, to be the best known device at present for a safety guard at the ends of bridges. I may say, further, that I have known two instances where care were detailed and this device has re-railed them.

MR. MCINARNA, of the New York, Pennsylvania & Ohio, had in his possession letters recommending "The Latimer Safety Guard" from Mr. J. E. Childs, General Manager New York, Ontario & Western, and J. E. Childs, their General Superintendent; A. U. Morrison, General Manager C. & M. L. S.; I. Burnett, of the Joliet Steel Works, and others, as well as extracts from railroad journals, all of which were read, and it was voted that they be incorporated in the proceedings of the Association.

MR. CHAS. LATIMER being present, was called upon and responded as follows:

MR. LATIMER: Regarding this device please understand that I have no axe to grind. The invention was long ago sold, and I sold it because I could not attend to it. I never solicited anyone to take it that I know of, I never sent a circular out and it was clearly through the merit of the invention that it was introduced. The invention as it stands to-day is precisely the same as originally and there has been no improvement in it. The invention is called "Childs' Safety Guard." I received \$300 for that invention, and I would ten times rather have the credit of it than all the money that could be given me. I hope that you will not consider that I desire to laud myself in this. On the other hand, if it has saved, or is saving any lives, it a sufficient gratification to me and I feel highly compensated. (Applause.)

MR. CRAIG (President): From the correspondence I have received from railroad managers I judge that they are looking forward to the discussion on this question more than any other; and, gentlemen, I will say that you are not a local organization, but a national organization, and the railroads from the Atlantic to the Pacific are looking anxiously toward this meeting here to-day, and your experience and knowledge should be freely given.

MR. PRESTON: I believe that in addition to that safety guard and re-railing guard it is best to use a 6 x 8 wooden guard rail outside of the rails. Our road has adopted that plan.

MR. BURNETT: I would recommend as a matter of safety—not economy—that the guard rail on the inside extend the entire length of the bridge from one guard rail to the other.

MR. CAFFEY: I have an amendment to offer to the report of the Committee, as follows:

"Resolved, That the report of the Committee on Re-railing Devices and Guard Rails on Bridges be amended by adding to it, that it is the sense of this Association that, in addition to the re-railing appliances, the guard rails extend the whole length of the bridge, and that the guard rail consist of a rail of about the same size as the rails in the main track and be placed on the inside of the main rails, and that the distance between the main rail and guard rail be not less than two inches nor more than eight inches."

The amendment was accepted, and the report of the Committee, as amended, was adopted.

#### STANDARD TRACK JOINTS.

The Committee on Standard Track Joints reported as follows:

Your Committee appointed to report on Standard Track Joints beg to submit the following:

Having given this very important subject careful investigation and consideration, we believe that the double angle bar, when properly made, is the best form of joint that we now of.

The essential features of a good angle bar are these, viz.:

1st. Having sufficient thickness of top so as to give the largest possible bearing surface under the head of the rail.

2d. The greatest thickness and depth possible so as to fit closely and properly between the head and base of the rail.

3d. Having base sufficiently wide to allow slots to be made for spikes to be driven through them into the joint ties to prevent as far as possible the creeping of the rails.

4th. Having bolt holes of oblong form and spaced so as the two middle holes will bring the bolts as near to the rail ends as possible without detriment or injury to the rails.

5th. Having round or button head bolts, with elongated neck, to properly fit the oblong hole to prevent bolts turning while being screwed on.

6th. Having hexagon nuts with a steel spring washer between nut and angle bar.

7th. That angle bars should not be less than 28 in. in length and strong in proportion.

It is our opinion that the joint—a blue print of which is herewith attached—comes nearest to these requirements.

R. CAFFEY,  
W. RILEY,  
H. D. HANOVER, } Committee.  
A. B. ADAMS,

MR. RAMSEY (Cincinnati, Hamilton & Dayton): This splice has elongated holes, both outside and inside, and causes some trouble with the Verona nut-locks.

MR. DICKSON: We use the oblong on both sides and have no difficulty.

MR. NOLAN (New Orleans & Texas R. R.): It has been recommended that the ties be 6 in. apart for a 13-in. plate for a suspended joint. It would be necessary to have two 12 in. ties to keep the joints from moving over. If the ties are 6 in. apart only, and 7 in. deep, I think it impossible to tamp them to drive the necessary support. I am in favor of holding the bolt stationary in the angle bar. A washer has been recommended, which I think is a good thing to keep the Verona nut-lock out of the angle bar. I think the 3-tie joint is the better joint. From the expression of those gentlemen who have had an opportunity of testing the 3-tie joint I am fully convinced that that is the best. I think it should have 6 bolts and the bar slotted at the end, by no means in the centre.

MR. MCINARNA: I wish it go on record that I always favor the joint upon the tie.

MR. M. REEDY (Vandalia Line): I think they should not be slotted in the centre; the tie under the centre should be permitted to give its full support to the centre of the bar.

MR. REILLY (Pennsylvania & New York Canal & R. R.): We use the 40-in. angle bar and like them. I am in favor of having them taper from the end.

MR. LATIMER (with the New York, Pennsylvania & Ohio Co.): We have changed from the steel splice to the angle splice which came with the English steel rail. I have changed entirely my method of using the angle splices. They should have been laid on the tie.

The report of the Committee on Standard Track Joints was not acted upon, but returned to the Committee to be acted upon next year.

#### STANDARD HAND CARS.

The Committee on Standard Hand Cars reported as follows: Your Committee on "Standard Hand Cars" beg to offer the



following report: That we recommend a car capable of carrying a gang of from three to ten men, and necessary tools, at a fair rate of speed.

The car should not exceed 350 lbs. in weight, the gearing being about three and a half times to one, and the cost of the car not to exceed \$45.

W. B. STIMSON,  
D. MCINTAFFER,  
A. J. DIDDLE,  
CHAS. MELVILLE,  
P. K. ROACH. } Committee.

#### EVENING SESSION.

At the evening session resolutions of regret were adopted concerning the death of Mr. David Coleman, Roadmaster. The Constitution and By-Laws were revised; the Secretary given charge of the printing of the proceedings, with increased salary. The usual resolutions of thanks were passed; Washington decided upon as the next place of meeting and the following officers were elected: President (re-elected), Mr. J. W. Craig, Charleston & Savannah R. R., Charleston, S. C.; 1st Vice-President, I. Burnett, Joliet Steel Works; 2d Vice-President, Jas. Sloan, Chicago & Eastern Illinois R. R.; Secretary and Treasurer, Mr. W. H. Reed, Savannah, Florida & Western R. R. Members of the Executive Committee, Mr. R. Caffrey, Lehigh Valley R. R., 3 years, and Mr. C. H. Cornell, Chicago, Milwaukee & St. Paul, 1 year.

#### THE EXHIBITS.

Following is a brief résumé of the exhibits in the meeting room, as well as in the corridors and various apartments of the Kennard House:

**Frogs and Crossings.**—The Cleveland Frog & Crossing Works, Bowler & Co., exhibited Lucas' patent frog and crossing, the patentee, Mr. George Lucas, representing his own inventions. W. H. Elliot, of St. Louis, was on hand at the Kennard House as the representative of the St. Louis concern, which has made his paternal ancestor's name famous. The Ajax Forge Co., of Chicago, displayed frogs, rail braces and foot guards, Manager Griffin and Agent French dividing the honors of representing the institution. Mr. B. B. Kerr, for Pettibone, Mulliken & Co., of Chicago, exhibited the Strom patent clamp frog, which is held together without weakening the rails by bolt holes. A cast-iron foot guard is placed at either end of the filling. A device which attracted unusual interest was the Fontaine continuous crossing of Toledo, shown in model by the inventor, R. H. St. John, of Cleveland, exhibited a crossing on the same principle, but which he claimed was not an infringement.

H. Chance, of Fostoria, patentee of the Chance solid crucible steel-filled safety frog, was present with one of his devices, as well as his continuous railroad crossing.

**Hand Cars, Push Cars and Railroad Velocipedes.**—Unquestionably the greatest elaboration was attained in these displays. Fairbanks, Morse & Co., Chicago, showed the improved cars of the Sheffield Velocipede Co., of Three Rivers, Mich. A feature of these cars is the loose wheel which enables track men to get the car on and off the track with great ease. The wooden wheel with iron hub, and tires of wrought steel is an element for which much is claimed. The Kalamazoo hand cars, push cars and velocipedes with combination wood wheels, and brass bearings throughout, showed up to advantage. The Buda, Ill., Foundry & Manufacturing Co. exhibited a novelty in their wood wheel (kiln dried ash), which is surrounded by a steel tire.

**Rail Saw.**—Quite as novel as any other exhibit was the portable rail saw shown by James B. Brady, agent of Manning, Maxwell & Moore, New York.

**Stand-Pipe.**—The Dodge railroad stand-pipe with a flexible rubber joint adapting it to a high or low tender received marked attention. Shown by Fairbanks, Morse & Co.

**Railway Safety Bridge Guard.**—The Latimer safety guard, which was adopted unanimously by the convention as the standard, was shown, in model, by W. J. Morden, Chicago. It was adjudged to be unrivaled.

**Track Jacks and Track Drills.**—C. A. Thompson, representing Andrew Warren, St. Louis, exhibited standard wrought-iron track jacks and tripod ratchet lifting jack, as well as the Bieland and Underwood track drills. Pettibone & Mulliken, Chicago, showed the Jenney jack. President Danbar, of the Railway Speed Recorder Co., Kent, O., was on hand with the well-known Hawkins' patent jack. Mr. Franklin was in charge of the exhibit of Fairbanks, Morse & Co., which included among other novelties Barrett's improved compound lever jacks, lifting the load on both upward and downward stroke. Mr. Barrett was also present. Arthur L. Stanford, of Waukegan, showed his track jack, manufactured by Crerar, Adams & Co., Chicago, as well as his self-feeding track drill.

**Rail Joints and Fastenings.**—Richard Caffery, of the Lehigh Valley Railroad, exhibited splice bar, as used by that company. Lunberg & Jeer, Cleveland, displayed a rail chair, for which patent has been applied for, which does away with the use of nuts or bolts in rail joints. D. H. Mahoney, of Olney, Ill., represented his rail joint shim for protecting the extremities of rails. This consists of a piece of superior charcoal iron, inserted between the rail ends. Mr. O. M. Edgerly, representing the Stark Nut Lock, of St. Louis, displayed that company's joint fastenings. A steel spring track bolt, shown by J. L. Pope, of Cleveland, elicited much favorable comment. J. S. Hoffecker, representing the Vulcanized Fibre Co., of Wilmington, Del., exhibited the washers made by that company.

**Ruffner, Dunn & Co., Schuylkill Falls, Pa.** were represented by the head of the firm, who showed the Excelsior automatic nut lock and fish-plate springs. David Dodd, President of the National Lock Washer Co., Newark, exhibited the simple and effective device made by his company. The Stephen G. Scott tie truss, as shown by the inventor, in model, attracted a great deal of attention and discussion as to its merits. S. A. McLean's improved railroad spike was displayed by the inventor.

**Semaphores.**—Mr. T. W. Snow exhibited the magneto semaphores signal of the Pennsylvania Steel Company, of Steelton, Pa. Mr. Fontaine, of Toledo, showed his patent iron semaphores target.

**Steam Shovel and Ballast Unloader.**—The Marion, O., steam shovel and the Barnhart ballast unloader were displayed (in model) by Mr. George Foster, Marion.

**Throw Switch.**—J. L. Hoyer, Cleveland, showed a model of a safety switch by which engineers can throw their own switches. It is his own invention.

#### Western Railway Club.

##### AXLE FOR 60,000-LB. CAR.

The regular monthly meeting of this club was held on Wednesday evening last in Chicago, President Rhodes in the chair. The subject for discussion was the best form and dimensions of axle for 60,000-lb. car.

Mr. G. A. SCHROYER (Chicago & Northwestern) said that an axle 6 ft. 2½ in., centre to centre of journals, with journals 6 in. × 3½ in., with dust guard and collar, met all the requirements of former days. But as a car to carry heavier load was needed, an axle with 3½ in. × 7 in. journals was made standard. He considered 6 ft. 3 in. from centre to centre the point where we should stop. He would recommend an axle for 60,000-lb. cars

as follows: 7 ft. 1½ in. over all; 6 ft. 11 in. inside of collars; 6 ft. 3 in. from centre to centre of journals; 4½ in. diameter by 8 in. length of journals; 5 in. diameter of dust guard by 2½ in. length; 5½ in. diameter of wheel seat; 4½ in. diameter in centre of axles.

In the discussion which followed President RHODES said the recommendation of Master Car-Builders' Committee on standard axle 60,000-lb. car was lost because the old Master Car-Builders' standard was changed. The recommendation made before the Master Car-Builders' Association was no provision for an axle after it became worn so that it was too small for a 60,000 lb. car. Mr. B. K. VERBRYCK (Chicago, Rock Island & Pacific) took exceptions to Mr. Schroyer's ideas.

Mr. JOHN HICKEY (Milwaukee, Lake Shore & Western) thought when an axle was worn too small for 60,000 lb. car, the iron is crystallized and unfit for further use.

Messrs. SMART (Michigan Central), WILLIAM FORSYTHE, H. FORSYTHE (Chicago, Burlington & Quincy) and SOUTHERLAND (Chicago & Atlantic) also took part in the discussion.

Mr. A. FORSYTHE (Chicago, Burlington & Quincy) then read some questions regarding springs and equalizers issued by a committee of the Master Mechanics' Association, and answers thereto in the absence of Mr. John Mackenzie (New York, Chicago & St. Louis), whose practice has been to use crucible steel, the brakes being as wide as possible, and 1½ in. thick. The longer the spring the greater the flexibility, but there must be a limit and the deflection under the load limits the span in practice to 32 in. or 34 in. Spring should have such a camber or set that it will be nearly straight under working load or stand the greatest strain put on it. In the above problems the set under load in the driver springs should be ¼ in. to 1 in. The engine truck springs should deflect 1½ in. under the load. No change should be made in the thickness of steel, but for increase of weight, an increased width or number of leaves should occur. The flexibility varies inversely as the cube of the thickness, but only as the width or the square of number of leaves which makes evident the change that should follow from a variation in weight.

The usual practice is to use the slot, because the width is usually too limited to permit using a stirrup without cutting away so as to form a tongue over which the stirrup is to hook. The band is made by hand slide, flattening a strip of iron 3 in. to 3½ in. in width, by ½ in. to ¾ in. thick. In thickness there would be a disadvantage in using bands wider at the bottom than at the top, as far as the spring is concerned, for so much of the flexibility of the lower leaves is lost. The narrower the band the better, consistent with the amount required for the bearing surface of the spring in the pocket. The usual practice is to use an equalizer slotted for a post upon which it bears by means of steel key through the post, the bearing surface on the equalizer being faced with steel. The post instead of resting on top of the frame is put through a slot in the frame, making a cheap form of construction. The post is fastened to the frame by a steel key seating in a steel key seat resting on the under side of the frame. The finished equalizer is composed of two bars of iron, each 4 in. by ½ in., 5 ft. 11½ in. long, resting on the top of the axle boxes. The two parts are kept rigidly in their upright position by the pin holding the spring stirrup. Passing through an intervening cast-iron sleeve, the spring sets into a pocket resting on the under side of the frames. A blue print showing details of construction, was exhibited.

#### SAFETY CAR HEATING.

Reporting upon the subject of safe car heating, the committee said: Public opinion and the action of some of the state legislatures are so strongly opposed to the regular use of the car stove that the railway companies appreciate the importance of immediate experiment with continuous steam heating for cars, and are actively and earnestly at work preparing for such tests this winter.

An interesting summary, showing the extent to which the various systems of car heating have been tried and adopted, appeared in the last issue of the *Railroad Gazette*.

The Chicago & Northwestern, Pennsylvania and Chicago, Burlington & Quincy are about to experiment with the Williams system of heating. The Chicago, Milwaukee & St. Paul is trying an original method of heating.

The introduction of continuous heating being secured, it is now important that some action be taken to make the systems interchangeable, or at least obtain a standard coupling for the main steam pipes. This is needed to some extent among roads interchanging their coaches and sleepers, but to a much larger extent for the Pullman cars now running regularly on so many lines. A Pullman car is now the foreign car with which we have to interchange, and some effort should be made to have a system of continuous steam heating with a standard steam coupling adopted for Pullman cars; therefore, resolved:

*Whereas*, The railroads of the country are rapidly introducing various system of continuous steam heating for their passenger cars, each system having its own form of steam coupling and not interchangeable with the others, *Resolved*, that a committee of three be appointed from this club to meet similar committees from the other railroad clubs and a representative of the Pullman Palace Car Co. for the purpose of united effort in securing a standard coupling for steam heating on passenger cars.

*Resolved*, that the Secretary be instructed to advise the other Railroad Clubs and the Pullman Palace Car Co. of this action, requesting them to name a date and place for the joint meeting of the committee. W. FORSYTHE, J. N. BARR and W. A. SCOTT, committee.

Messrs. RHODES, W. V. PERRY, SWANSTON, A. FORSYTHE, ANGUS SINCLAIR, WILLARD SMITH, GEO. A. GIBBS, JOHN HICKEY, B. K. VERBRYCK and Mr. SEWALL (Sewall Heater Co.) took part in the discussion, Mr. GEO. A. GIBBS alone dissenting from the resolutions, which were adopted, and the President appointed W. FORSYTH, J. N. BARR and C. A. SCHROYER as such committee. The meeting then adjourned.

#### TECHNICAL.

##### The Car Shops.

The Laconia (N. H.) Car Co. has taken a \$100,000 order for freight and passenger cars from the Boston & Maine.

The Anniston Car Works, at Anniston, Ala., have just completed an elegant sleeper to be sent to the Piedmont Exposition at Atlanta. They have also commenced work on a car which is to be built altogether of Alabama material.

The Gilbert Car Co., of Troy, N. Y., are busy on orders for the New York City & Northern, the Hoboken Cable Road and others. Among special orders they have one for an electric motor for the Sprague Motor Co., a very handsome car about the size of those in use on the New York elevated roads. Also a private street railroad car, to be drawn by horses, for the Emperor of Brazil. This will be of a peculiar pattern, with a dome in the centre, giving extra light. It will be beautifully finished and have toilet facilities and a wash stand in it. Comfortable stuffed chairs

will be used in place of seats, and the whole car will be unique in many ways.

#### Bridge Notes.

Bids are requested for an iron railroad bridge with piers and approaches across the main Concho River, near San Angelo, Tex. Address Wm. S. Kelly, San Angelo, Tex., until Oct. 31.

The Columbia River Bridge Co., of Portland, Oregon, has been incorporated. Capital stock, \$500,000. H. S. Rowe, M. C. George, R. L. Durham and others, incorporators.

The M. Lassig Bridge & Iron Works Co., of Chicago, has been incorporated. Capital stock, \$250,000. Moritz Lassig, 97 Dearborn street, Wm. G. Schniglan and Chas. H. Hawkins, incorporators.

#### Manufacturing and Business.

The Universal Radial Drill Co., Cincinnati, O., have removed to their new shop on Eggleston avenue. The new building is 72 × 196 ft., part two and part four stories in height. This about doubles the company's facilities for doing work.

The Hoyt Railroad Track Co., of Chicago, has filed a certificate with the Secretary of State of Illinois, increasing its capital stock from \$500,000 to \$1,000,000.

The Rood & Brown Car Wheel Works, of Buffalo, N. Y., have added three extra cranes and ten annealing pits, which will increase their capacity 200 wheels a day.

William Mann, of the firm of William Mann & Co., foundrymen, New Castle, Pa., has invented an improved car wheel and axle for limestone and coal cars, and is manufacturing them at the foundry. The firm has received several orders from abroad for them. Mr. Mann has applied for a patent.

Rawson & Lehen, of Wellsville, Mo., have ordered a 50 horse-power automatic engine from the Cooper Mfg. Co. Works, Mt. Vernon, Ohio.

The New York Iron Roofing & Corrugating Co. report sales for the past weeks of roofing and siding to two railroads in Florida and Texas, to the Knickerbocker Ice Co., for the new temple in Salt Lake City, and for two large elevators, one at Port Richmond, S. I., and one at Buffalo, N. Y.

Stuart & Co., of Winchester, Ky., advertise for rails, engines and motors for a combination dummy and horse-car line 2 or 3 miles long.

Messrs. Bowler & Co., Cleveland, O., manufacturers of car, engine, truck and mining wheels, have just completed a new foundry. The building is 140 ft. wide and 200 ft. long, containing 16 cranes and molding floors and each floor holding 20 wheels.

Chadbourne & Hastings, Philadelphia agents for Sprague Electric Railway & Motor Co., have closed during the past week a contract with the Wilkesbarre & Suburban Street Railroad Co. to equip their line with the Sprague system. The line will be 3½ miles long, and 2 cars will be in operation this Fall. The electric plant, which the company erect themselves, will have a capacity for operating several more cars.

The Carbondale & Jermyn Street Railroad has also contracted with the same parties for the Sprague system to be used on its road.

#### Iron and Steel.

The Eastern Forge Co., at Deering, and the Cape Ann Forge Co., of Gloucester, Mass., have consolidated. The company at Deering will make a specialty of car axles, shape work and shafting.

The Birmingham (Ala.) Iron Works are filling a contract for 35,000 ft. of cast-iron piping for the natural gas company.

The output of steel rails by the Union Steel Co., of Chicago, in September surpassed that for any previous month, falling but a few tons short of 17,000 gross tons. The best 24 hours work in that time was 922 gross tons. In the actual number of rails rolled this was not the best day, the difference being due to the kind of rails made.

It is expected that the number of men employed at the Eastern Forge Company, Portland, Me., will soon be increased and the works run day and night. Five heavy hammers (one of them weighing six tons) are in constant use. A new building, 70 × 40 ft., is being built on the premises in which to store scrap iron; the wharf accommodations are being enlarged and other extensive improvements are in contemplation.

The Cookson Iron Works Co. is building extensive works at Manchester, Mo. The building upon which it is at present at work is 75 × 275 ft., and other buildings will follow. The company manufacture frogs, switches, anchors, crossings, bridges, etc.

The big cast-iron cylinders to be used in sinking the shaft for Cleveland's second lake tunnel will be seventeen in number and 9 ft. in diameter and 9 ft. high. Their total weight will be 317,500 lbs. The Variety Iron Works, of Cleveland, O., were the successful bidders for the job.

The East Birmingham (Ala.) Machinery and Foundry Co. now has its building nearly finished. The plant will be in running order in about two weeks, and a force of machinery molders and machinists is now being employed. The company will employ about 100 men, and has perfected arrangements for building cottages for them in East Birmingham.

Articles of incorporation of the Iowa Rolling Mill Co., capital stock \$70,000, have been filed. The company has purchased the plant of the Burlington Rolling Mill Co., Burlington, Ia. The works will be thoroughly repaired and enlarged and started in a few weeks.

The National Self-Heating Sad Iron Co., of East St. Louis, Ill., has filed articles of incorporation. The capital stock is \$140,000, and the incorporators J. F. Kennedy, Gustave Heidel and George Blackman.

The South Tredegar Works, of Chattanooga, Tenn., are engaged on an order for splice bars for 280 miles of railroad between Macon and Palatka, Fla. The Lookout Iron Co., of the same city, is now engaged on a heavy order for the Central Railroad.

The Linden Steel Co., Pittsburgh, Pa., have an order for 1,100 tons of 1½ in. to 2½ in. protective deck-plates. The plates are for the two cruisers which Wm. Cramp & Sons are building for the government. The company will also make 450 tons of hull-plates. They are still having wonderful success in meeting the requirements of the government.

The Troy, N. Y., Rolling Mills have an order for 1,100 tons of 70-lb. steel rails for the Buffalo, Rochester & Pittsburgh.

A chain has just been finished at D. Round's Chain Works in Newburg (Cleveland, O.) which is 634 ft. long and weighs 20 tons. It is made of iron and is 2½ in. in diameter. Each link measures 15 in., and weighs 50 lbs. The cable will be used on the Marine Railroad in California.

#### Continuous Heating.

The method of continuous heating devised by Mr. F. M. Wilder and owned by the Safety Car Heating Co., of New York, is being applied to five vestibule trains running between New York and Chicago, by the Pennsylvania route. This device has also been applied to numerous Pullman and Wagner cars.





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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Our correspondent, A. T. G., advances no novel proposition when he argues that a perfectly efficient freight brake should apply its retarding force in proportion to the load on the wheels. There can be no doubt that it is mechanically possible to devise such a brake, but the question is whether the extra complexity would be worth the advantages gained. In railroading, as in other affairs, it is not the nearest approach to perfection, but the device that is most free from obvious defects that gains the day and obtains general adoption. A brake in which the power could be automatically proportioned to the weight of the cars, but which produced violent shocks, would in practice be superseded by a brake in which the same brake shoe pressure was applied to both loaded and empty cars, but which had not the fatal objection of producing shocks.

It appears highly probable from the results of the Burlington brake tests that a brake which can stop a train of 50 empty cars without shock will also stop a mixed train of loaded and empty cars without any objectionable impact. As the weight and momentum of the mixed train is greater and the retarding force unchanged, it is obvious that the distance in which the stop can be made will be increased. Any simple appliance to obviate this objection would be valuable, but it would be hardly business-like to declare a brake unfit for practical use because it does not possess such a device.

The difficulty brake inventors have had to contend with does not apparently arise from the fact that loaded and empty cars are mixed in a train. If shocks were so caused, they would be felt in short trains. But repeated experiments have shown that the length of a train and not its composition causes shocks. There can be no doubt that a satisfactory freight-train brake must be practically simultaneous in action throughout the whole train. Unless it possesses this feature, the shocks will be destructive to both cars and freight. If in addition the retarding force of such a brake can be varied in proportion to the total weight of each car, another valuable feature is gained. So far, however, as our present experience can guide us, the variation of power in proportion to load is not essential, though it would be highly beneficial in reducing the distance in which an ordinary freight train could be stopped.

The pressure of heavy summer excursion business was mentioned at the meeting of the New England Club as a reason why car-heating apparatus could not be got ready for the opening of the cool season, the cars being constantly on the road and out of the reach of steam-pipe fitters. At first thought it would hardly seem that any general manager would offer this as a serious reason for postponing the performance of a duty on which contingencies of human life so certainly hang; and yet the manager of the unfortunate Chicago & Atlantic, perhaps, took this very position, and no doubt would feel justified in trusting to luck or chance as implicitly as many others are doing to-

day. But, again, is it true that cars cannot be kept in ordinary use and still be at the disposal of the shopmen a portion of the time? Very few cars are on the road 24 hours a day. On President Cleveland's vestibuled train "work was prosecuted night and day," and few railroad presidents would hesitate at a little night work if a private car were in danger of not being ready for a pleasure trip. Excursion business is not absolutely forced upon a road; it is generally invited, and the invitation should be cautiously tendered if it involves risk to regular passengers the following winter. If tendered at all this year, it should have been tempered with a price high enough to warrant a little extra effort in putting in safe heating apparatus.

Legislative regulation of railroad matters, which was given out as a principal topic for the Boston meeting, was not much talked about. It is a difficult subject to discuss. Practically, there are generally just two lines to pursue: prevent action if possible, and comply quickly if prevention isn't possible. A railroad will work night and day to build a piece of track or to circumvent a rival in a similar enterprise, and all because, by thus hurrying, certain ends can be secured in compliance with law. Perhaps legislators conclude from this that roads can show equal celerity in complying with other laws.

The most important point in the Committee's report to the Time Convention last week was that concerning the numbers of the rules, the recommendation being, in effect, that no one shall disturb either the wording or the number of a rule in the least. The importance of this cannot be over-estimated. One of the ostensible objects in seeking uniformity was the added convenience and safety in cases where men are hired from other roads, who if their habits have been different are likely to make blunders through the force of habit; and it needs no argument to show that one of the first elements of simplicity is uniformity of arrangement. A brakeman needs not only to feel that he can find the same rule that he worked under on a former road, but also that he can find it easily and quickly; and moreover that when he has found it, it is really the same in every particular. A rule which is like the uniform rule on the same topic, except in one or two words or clauses, is more dangerous in some respects than one which has radical differences, for its appearance tends to mislead the reader. Some of the roads which have already adopted the uniform rules have disregarded this injunction, notably those presided over by gentlemen who served on the Committee; but they doubtless printed their manuals before the final action was taken; and, moreover, these lately issued manuals must, after all, be regarded as somewhat experimental. Further changes will certainly be found desirable, and it will be unfortunate if any one puts so much money into the printing or binding that he feels disinclined to make further revision. One of the chief evils connected with the preparation of manuals always has been the feeling, more or less distinct, that such a work must be regarded as an exceptional undertaking and the finished book be regarded in the nature of a monument, to be altered or disturbed only at rare intervals. Wide-awake superintendents constantly feel the need of making changes in their codes, but are deterred by a feeling that it is, or was, an embodiment of perfection and so must be approached with awe. Changes should be made with great caution, of course; but this feeling may easily be carried too far.

In our abstract of the Committee's report last week we omitted to say that there were several verbal changes of a minor nature which were not mentioned. Any one desiring to use the code of telegraph rules will of course wait for the official copy from Secretary Allen before proceeding.

The use of the whistle has decreased two-thirds on the Boston & Albany within the past few years, according to Mr. F. D. Adams' statement at the New England Club last week, and in his judgment the remaining third might as well be dispensed with. This is peculiarly a matter in which the public has a right and duty to express its wishes. A man constantly engaged in the business of train handling and train running, is habituated to so much noise that he does not himself feel any objection to the whistle, and so does not seek to suit neighboring residents' wishes, however strongly disposed to please (or not to displease) he may be. Still, these neighbors do, many of them, desire quiet, and they have a right to require it unless there are good reasons to the contrary; and it therefore becomes their duty or that of their representatives, the municipal officers, to jog the memory of noise-loving railroaders as often as may

be necessary. Notwithstanding the great improvement in this matter of noise in many localities, there are still hundreds, probably thousands, of careless runners to be tamed down to a civilized standard. Not long ago the writer slept in a hotel near a station on one of the "Trunk Lines" where freight trains stopped for coal and water, and there was enough steam wasted during that one night to heat several hundred cars by the Dusenbury system, or even without any system. The freight runners sounded the whistle when they sighted the station and then again when they came in sight of the signalman; then they would give a few desultory blasts and then signal to let off brakes; after a while they drew near the yard, and, seeing the way clear, repeated the off-brake signal. Then they stopped at the tank, and after an enforced quiet of a few minutes vented their feelings by loudly notifying the brakemen that they were about to start again; and so on, over and over. And all this could have been obviated (except, perhaps, in time of dense fog) by a little training; and on this very road the discipline regarding whistling is, in some portions, admirable. The principle seems to be, like the ruling idea of some freight-claim departments, to accede to the public's reasonable demands when those demands are urged, and to wholly ignore them when they are not pressed. Where whistling must be done, there is a duty to make the blasts as short as possible. The practice of many of the Boston & Albany runners is admirable in this respect. Roads which try to avoid giving offense by making their whistles dull and husky run a risk, because for use as a danger signal the blast should be loud and sharp.

General Manager Broughton, of the Chicago & Atlantic, had only recently issued to his men a long circular rehearsing many of the dangers to be guarded against, and giving numerous exhortations to care and faithfulness. The Kouts collision is a sad commentary on this order, and forces the question whether it would not have been better to make sure that even a few of the rules already issued were well known and understood, than to thus vaguely put forth a multitude of heterogeneous precepts devoid of any plan or arrangement; and this in a way that might almost as well have said "we know that you have not conscientiously studied and tried to carry out the instructions given you, and we know of no way to remedy the matter but to issue this general appeal which can be disregarded with the same impunity that has followed your disregard of previous orders."

In dunning a debtor whom we are afraid of, and who must be handled with tenderness, we send "appeals," "reminders," and such like; we carry the idea, falsely or otherwise, that he may pay or not, as he deems most agreeable; but in proceeding against a person from whom we are determined to compel payment we take a different course. Ambiguous phrases and those that give merely sound or smoothness are laid aside; directness is employed in everything said, and is compelled in the answers. The same principle applies in getting information as in getting money. The superintendent who wants positive knowledge that his men understand certain rules and are intelligently trying to obey them must ask plain questions, require positive answers to them, and pursue the process until he tests not only their willingness but their intelligence.

In another column will be found some extracts from the newly-revised train rules of the Louisville & Nashville, including one in the form of a drawing. While the use of drawings is not an unheard-of thing, it is novel enough to deserve attention, and superintendents should by this example be reminded of the effectiveness of this kind of instruction and of the fact that it is not used nearly so much as it ought to be. In this particular matter of loading lumber any superintendent can see the value of clear instructions, for there is no one but has had the experience of hot boxes or ruined journals from improper loading. Conductors as well as agents need the aid of this instructive diagram so that they may learn to readily detect cars whose load is in any degree variant from the right condition, and which, therefore, may need more than ordinary watching. We do not here inquire whether the Louisville & Nashville's way is the best way, or discuss the plan of loading in any way; the point we wish to make being the necessity of having some rule on the subject, and of having it clearly understood.

In publishing rules like those here referred to and in commenting upon their importance, we desire to be careful not to give them undue prominence. The Railroad Gazette has often enough said that printed rules however excellent or well arranged, are only a vehicle



for conveying ideas or an auxiliary in the teaching process; but the fact seems to need restating, nevertheless. The providing of an elaborate and carefully arranged code and then leaving it to enforce itself, is somewhat like firing up a magnificent locomotive and then starting it out on the road with flangeless wheels. If everything goes as we wish it to go, the engine will stay on the track, but if any influence whatever tends to draw it away from the line which it ought to pursue, it is pretty sure to bring itself and its admirers to grief.

#### Paying and Non-Paying Business.

There was a time when most people believed that differences in railroad rates should be based on relative cost of service. That day is fortunately past. It is recognized that classification must be based upon value, that cheap goods must be charged cheap rates, that it is impossible for the railroad to make as much profit per ton on coal or wheat as on dry goods or stoves. But the old error dies hard, and when a case is presented which involves the same principles in a new form, people are not ready to apply them.

In comparing English and American railroad economy a fortnight ago, we mentioned the fact that most of our roads made nearly all their profit on freight, and very little on passengers. Some of our readers have rushed to the conclusion that this fact, if it was a fact, proved that our roads were guilty of extortionate charges on freight. They can see why rates for cheap goods should be made low in proportion to the expense; but they cannot see why it is anything better than favoritism to extend the same principle to passengers while freight rates are kept at a relatively high figure.

The simplest answer to this is to say that the profit must be made on freight if it is to be made at all. The passenger business can be made to yield a fair share of the profit only by one of three methods: an increase of rate, an increase of volume, or a diminution in expenses. Increase of rate would generally defeat its own end by causing a reduction in volume; increase in volume could only be purchased by a diminution in rate. Diminution of expenses would involve diminution of facilities, and lessened number of passenger trains, which is the very last thing that a young and enterprising community would stand. But if they demand the facilities, they must pay for them; if not with the passenger traffic, then with the freight traffic.

If a country has large population and large business, it can have plenty of railroad service and can pay for it both with passengers and freight. If it has small population and small business, it cannot pay for a railroad with passengers or freight either. But if it has small population and relatively large business, or large population and relatively small business, the case is different. It has the choice either of going without railroads or of throwing the whole burden of the fixed charges upon the line of work which can bear them.

It is the distinguishing feature of a new country that industry produces large quantities of goods for shipment in proportion to the number of inhabitants. This reason alone is sufficient to make the freight business the one which can bear the burden of paying the fixed charges. But there are other reasons which combine with it. It is of the utmost importance, both to the railroad and the community, to attract settlers to undeveloped regions. For this purpose they are led to furnish passenger facilities out of proportion to any immediate prospect of return. They offer them, not for what they will themselves bring in in the way of earnings, but for the sake of the business which an increase of population will gradually create. They carry passengers without profit, just as some railroads have carried coal without profit, for the sake of aiding factories to produce goods of high value which would ultimately pay the railroad well for carrying them.

Once having begun to treat the passenger business in this way, it often made very little difference what rates the companies charged. The facilities being in some respects in excess of what the passengers could pay for, an increase of traffic produced few additional charges, and a diminution of traffic caused little or no economy. This is one reason why a war of rates in the passenger business makes so little impression on the finances of some of our roads. The increased volume of traffic does much to offset the lowering of fares, when there is no corresponding increase in operating expenses. In this last respect it is very different from a war of freight rates.

But it may perhaps be asked whether the railroads would not attract new business by lower freight rates quite as much as they attract new settlement by low passenger rates. No universal answer can be given to this question; but in general, they would not. A rail-

road rate is in some respects like a tax; and one of the most important features in a good tax is that it shall be paid at the most convenient time for the producer. High passage rates would come just at the wrong time for the settler. They come when he is incurring the heaviest expenses with no prospect of immediate return. On the other hand the same amount added to the cost of freight shipment comes at the time when the burden is least felt. It comes when the returns of productive industry are making themselves felt, so that the shipper knows where he stands, and does not have to advance money at a disadvantage.

Another still more important requisite of a good tax is that it should be proportioned to the ability of the taxpayers, and here again it is advantageous in a newly settled country to pay the fixed charges almost entirely from freight. The difference between freight and passenger rates in this respect is like the difference between an income tax and a poll tax. Everybody who comes into the country has to pay the passenger rates, only those who have something to sell are compelled to pay the freight rates. If the classification is well managed, there is a rough proportion between the income of the shipper, as measured by the value of the goods shipped, and the rates which he has to pay. Now this is more important in a new country than anywhere else. The business of such a country is in many respects speculative. Some men get enormous returns, others draw blanks in the lottery. High passenger rates would bear on all alike, high freight rates collect the most money from those who have produced the most. The community gets a benefit from cheap passenger facilities, which is more evenly diffused than what could be attained by any slight remission of rates on products for shipment.

This reasoning shows not merely that it is necessary for many of our roads to pay their fixed charges from freight receipts, but also that it is highly undesirable for the community that they should try to do anything else. It is as necessary for the public as it is for the railroad. The difference between an old and a new country in this respect necessitates a difference in practice for the sake of all parties. The railroad men adopted their present system because they had to. In so doing they have allowed abuses to creep in at some points. But the abuses are not the fault of the principle, but of its misapplication, and the attempt on the part of the public to substitute some cruder principle would be destructive, not merely to the railroads, but to the business interests of the whole community.

#### The Structures of the Elevated Roads in New York.

Last Monday the *Evening Post* published in the form of an interview some opinions of an "expert" upon the bridge and track structures of the elevated roads in this city. The sum of these opinions is that (1) The structures are subjected to a "tremendous and constantly increasing strain, for which they were not designed," and that disaster is only prevented by the "constant repairing process." (2) Mr. Elnathan Sweet, Jr., in 1880, in a report to an Assembly Committee, showed that certain parts of the structure were strained beyond the limits fixed by the Rapid Transit Commission, a condition of things not immediately dangerous, but still not according to good practice. (3) "No particular attention was paid to this report when it was issued. The engineers of the road have done a great deal toward remedying the defects pointed out. The Sixth avenue road has been re-enforced, and in parts almost built over. But any careful observer who watches the effect of a heavy train to-day, and has any experience in judging of deflection, will soon see that the limit set by the Rapid Transit Commission, which gave the road its charter, is constantly exceeded."

The engineer who reads this interview will not see in it any cause for alarm. He knows that if the elevated structures were to be built to-day, in the light of present knowledge of the work required of them, they would be built differently. But that would be rather for economy of maintenance, and to allow more tracks, more trains and heavier engines than from any fear that the present structures may not stand up under the strains to which they are subjected; and he will know how much weight to give to an off-hand "judgment of deflections." Unfortunately the opinions of the anonymous expert appear in the columns of a journal not given to sensations, and with the public will have some of the weight of its respectable name. Many a man who reads them will feel needless and perfectly useless anxiety; and the expert who gave out the opinions quoted in the *Post*, if he is an engineer, committed an indiscretion unworthy of his profession, and if he is not an engineer he should not be quoted as an expert.

The logical inference from his published opinions would be very damaging to the men responsible for the present condition of the elevated structures. Now if the expert did not know he ought to have known, and could have known, the following facts:

Feb. 20, 1885, a group of real experts made to the Chief Engineer of the Manhattan Company a report on the structures. These men were A. P. Boller, Birdsall Cornell, J. M. Wilson, T. C. Clarke, A. Bonzano, A. R. Whitney and Walter Kallé. They said that the tests of Prof. Thurston and their own examination showed that the material of the elevated structures had not been strained beyond, or near to its elastic limit. They examined the strain sheets of various parts and found them substantially correct. They inspected the structures themselves and found them safe for existing traffic, and saw no occasion for any anxiety on the part of the public. They were "satisfied that the structures are in better condition to-day [Feb. 20, 1885], than ever before." They recommended however the prosecution to completion of improvements in hand. These improvements have been pushed steadily, and have cost some \$300,000 since Mr. Sweet's report. The cross girders of the Sixth avenue line have been reinforced by plates riveted to the top and bottom flanges to give greater sectional area for the strains, and the webs have been stiffened. The track stringers have been doubled, so that where there was one under each rail there are now two. This work has been completed on the Sixth avenue line except a few cross girders in South Fifth avenue on which work is now progressing. On the Third avenue line the lattice girders for about seven miles of track have received double bracing, and that work is still going on.

This report and expression of opinion was based upon the use of locomotives no heavier than those in service at that time, and if heavier engines are used of course the committee can be held in no way responsible for any failure.

At the same time, Prof. Thurston made a very elaborate report on tests of specimens from the structures of the elevated roads, and concluded that the structures were correctly designed, and that they were not subject to danger from crystallization or any other form of deterioration of material.

Within the last eight months minute special examinations have been made of the Greenwich street and Ninth avenue line from the Battery to Fifty-third street, of the Third avenue structure and of the Sixth avenue structure, and detailed reports have been made as to construction, strains, condition and points requiring repair or strengthening. For the Ninth avenue line, on which the heaviest engines are never run, detailed estimates have been made of the cost of putting it in condition to carry the heaviest equipment of the system. All these examinations and reports were made by a specialist, in no way connected with the road, and for the purpose of ascertaining the truth. This work has been done entirely independently of the regular and constant inspection made by the engineers in the employ of the company.

On the Sixth avenue line generally it was found that the structure would carry the 22-ton locomotives and the trains now in use without exceeding the strains permitted by the Rapid Transit Commission. Special mention is made of the cross girders in South Fifth avenue, of which we have spoken above; and of some minor points requiring attention. The inspector concludes: "On the whole I found no signs whatever that the structure is overstrained or sagging or settling. On the contrary, it appears perfectly sound." This report was made last month.

On the Third avenue line the assumed loads were for 45,000-lb. engine and 84,000-lb. car, and the strains carefully calculated. The strains in the longitudinal girders were found below those specified by the Rapid Transit Commission, and below those used in good iron railroad bridge practice; and the girders were found as straight, sound and tight as new work. But nevertheless the work of double bracing the lattice girders is going on. The transverse girders in the main track are not well designed, but since re-enforcement the "margin of safety is large." The transverse girders at the terminals, and which carry the main cross-over tracks were found to be well designed and amply strong. A few columns were found with the spread top which were doing more work than they should. It was calculated that the strain in compression on the outside of the curved bar in these columns was 17,000 pounds per square inch, and on the inside the tensile strain is 9,000 pounds. Immediate re-enforcement of these columns was recommended. Yet repeated and minute examinations of these columns have not revealed any sign of actual shear. These are the worst strained members of the whole structure. Since this report



was made these columns have been re-enforced as recommended. The inspector concludes as follows: "In all essentials, and with the few exceptions noted, the road is, in my judgment, amply strong to carry the heaviest equipment (22-ton engines and 17-ton cars) permanently, and with absolute safety."

The report on the Ninth avenue line points out in detail those parts of the structure which are not up to the Rapid Transit specifications for heavy engines, and presents three plans for strengthening it preparatory to putting on the heavy equipment. There is much in this report as well as in the others of considerable technical interest, but we are not at liberty to publish it at present. What has been said, however, will show that the officers of the company know very minutely the state of their structures, and are taking no risks. It is a pity that the tracks are not on masonry arches through the blocks, with arches or plate girders across the streets; but who would have had the courage to put his money into such a monument at the time when the present roads were built?

#### The Telegraph Consolidation.

The transfer of the Baltimore & Ohio's telegraph to the Western Union has been effected, and five million dollars has been added to the already excessive capitalization of the latter company. That is, new stock to that amount will be added to the capital on which dividends are to be paid. Further, the Western Union undertakes to pay an annual rental of \$60,000. Just what it gets in return for this added burden it is hard to say. Freedom from a serious competition is the chief advantage. The last annual reports of the Baltimore & Ohio put the cost of acquisition and extension of its commercial system of telegraphs at \$3,872,693, and this item of indebtedness of the telegraph company was carried in the assets of the railroad company. This sum would be represented by 50,000 shares of Western Union stock at 77.45. This item did not include the value of the lines along the Baltimore & Ohio and its branches, nor the "district" companies in various large cities. It may be supposed that the basis of the agreement was therefore 50,000 shares of stock for the commercial lines and \$60,000 per annum for the use of the railroad lines. The revenue derived by the Baltimore & Ohio Railroad Company from the telegraph company is not given in the reports of the former; but the statement is made that the latter "has paid the agreed annual rental for the use of the wires." Nothing in the reports shows, however, what that rental was, or whether or not the \$3,872,000 was all that the railroad company had spent on the commercial lines, or whether the telegraph company was or was not actually self-sustaining. It is so probable, however, as to be almost certain that the road has not lost a source of revenue in the transfer of the telegraph, and that it has parted with a cause of inappreciable future expense and trouble.

The Western Union too has made a fairly good bargain. It gets a plant for much of which it has no use, but it gets rid of its most active and dangerous competitor. The money sunk in the plant is largely wasted, but it is the public and not the Western Union who will sooner or later have to suffer for that; for, while it is doubtful if rates will ever again be as high as they were before the competition of the Baltimore & Ohio, it is quite probable that next year or the year after they will be higher than they would have been had the Baltimore & Ohio never existed. That is, the consumer will eventually have to pay interest on the capital sunk in the useless plant, and just here we cannot do better than to republish what was said in the *Railroad Gazette* ten years ago at the time of the combination of the Western Union and the Atlantic & Pacific:

The telegraph war has at last ended, as doubtless was intended by those who began it, by the virtual consolidation of the Western Union with the Atlantic & Pacific. The result is almost inevitable when competition is attempted between two telegraph companies which cover the same field, and unfortunately circumstances make such competition unusually easy in the case of telegraph business. When a new company attempts to compete with the Western Union on ground occupied by the latter, if the old company has followed ordinary business instincts it has supplied the facilities required for all the business which will pay at the places where it has offices. Whatever capital may be invested by the new company in an attempt to serve the same places, therefore, is so much added to the necessary investment, and if both companies do a profitable business, then their customers pay more for interest on their investments than would be necessary if there were but one telegraph company. More than that, the expenses of the old company are very little reduced, even when a considerable portion of its business has been diverted to the competing line, and the expenses of the two companies are much greater than those of one doing the work of both would

be. If, then, rates should be made to just cover profits and 6 per cent. (or any other) rate of interest on the capital invested, the very first effect of a competing telegraph would be to raise the rates. However, as is well known, the reverse is the fact. At points where they compete the two companies do business at cost, or much below cost. The new company cannot hope to make any profit unless either it does more business than the old one per dollar invested, or does its work at lower cost. It is commonly charged that the capital of the Western Union is largely in excess of the value of its property, and probably enough this is true—at least, the effect of such competition as that of the Atlantic & Pacific is inevitably to make it too large. On the score of expenses, it is not probable that a new and small company will do any better than an old and large one, and in all cases the chief part of the earnings goes for expenses.

But if a new company has little power to make profits for itself, it has great power to destroy the profits of its competitors. Most telegraph business comes from the large cities, and a comparatively small investment will pay for lines between the leading towns. Thus, so long as it can pay expenses, a new company, without a very large capital, can very greatly injure a rival, however old and well established. So, though the old company may have no use for its rival's lines and other property, it will very much desire to get it out of the way, and unless it can actually kill it by competition—by making all its business worth less than its cost—it will finally be greatly tempted to pay something merely to get it out of the way. Indeed, if it bankrupts it by competition, it has to do substantially the same thing; it must buy the bankrupt lines, else they will again spoil business in a new owner's hands. The difference is that if the competition ends before bankruptcy the proprietors of the new line get better pay for their investment—sometimes, indeed, very high pay.

It is now doubtless inevitable either that the interest on telegraph investments be less, or that the rates paid for telegraphing be higher than would have been the case if the Atlantic & Pacific had never entered the field against the Western Union. Virtually the effect of its competition has been to increase considerably the necessary investment in telegraph property in this country. And, what is most regrettable, the next great scheme of competition will start with chances fairer than ever. If the Atlantic & Pacific could hope to succeed because it could provide lines at much less average cost than that of the Western Union lines, the Coming Telegraph Company's hopes will be stronger now that the Atlantic & Pacific investment is added to the Western Union's. And doubtless its projectors will reason that if they cannot make money from their business, they will at least be likely to sell out at a profit to the Western Union. If they have nerve and capital, they can spoil its business if it does not come to terms; and if it does come to terms, then we have the investment of the Coming Telegraph Company added to that of those which have preceded it—a totally unnecessary addition to the capital on which the telegraph business of the country will be made to pay interest if possible.

Is there any end to this process? If telegraphs were as costly as railroads, it would be too dangerous to tempt even the most daring of speculative capitalists. But telegraphs are easily made without very great cost, and one with a few offices may spoil a good deal of business. The process of constructing new lines for the purpose of compelling the old ones to buy them has been going on with the Atlantic cables down to the present day, with the effect of largely increasing the cost of messages, however it may have been with the price so far.

It is this readiness with which the cost of the telegraph system may be increased by additions which are not needed that gives the chief strength to the scheme for a government telegraph. The dangers of a corporate monopoly may be more considered by the community, but they are less than the dangers of competition in the form which it so frequently takes in telegraph business.

Nobody thinks that the Garretts started their telegraph line as a speculation, either to be sold out or to juggle with in the stock market. They had far more honorable ambition, but the result has been much the same, so far as the public is concerned.

#### Calking Steam Boilers.

No well-made boiler ought to require to be heavily calked and to provide for light calking it is imperative that the plates of a boiler should be effectually and thoroughly cleaned of all fire scale before being riveted up. Good boiler work should be very nearly tight without calking, but it is difficult to attain this degree of excellence with hand work. Hydraulic riveting, in which the plates are forcibly pressed together before the rivet is closed and made to fill the hole, will, if carefully done, be found to give a tight boiler without calking. It is obvious that tightness can only be secured by insuring metallic contact. If all the rivets fill the holes perfectly, no leakage can percolate past the rivet heads. If any rivet heads require calking, they should be cut out and a fresh rivet inserted, as a leak is a sure indication that the rivet does not fill the hole, and is possibly imperfectly closed in addition. It is also obvious that to insure a tight boiler the surfaces of the plates must be in metallic contact and must remain so when the boiler is subjected to the working pressure which with the alterations of temperature will produce certain inevitable changes in the form of the boiler. It is obviously necessary that the surfaces of the plates should be smooth in order to insure metallic contact, and that this cannot be attained unless the scale covers the plates completely or is wholly detached. As a slight pin-hole in the magnetic oxide with which steel plates are coated will

cause a leakage, and under certain circumstances set up a galvanic and corrosive action, it is advisable to wholly detach the scale. This is easily done with iron plates, but steel plates cannot be completely cleaned of magnetic oxide by the usual mechanical methods. An excellent and effective method is that used at the Crewe Works of the London & Northwestern Railway (England). The plates are brushed over with muriatic acid diluted with water, and applied with a brush or pad made of woollen waste. This loosens and detaches all the scale, and the plates are then cleaned by a solution of lime, which effectually removes any surplus muriatic acid. If the plates are not wanted immediately, they can be protected from rust by a coat of turpentine and oil. If these precautions be not taken, the scale or dirt upon the plates becomes crushed to powder by the squeeze of the riveter, and a close metal to metal joint is rendered impossible, and the consequent leakage must be stopped by calking. With clean plates, much calking is not necessary, nor should it be countenanced, for after all calking is only an evidence of and a concession to more or less inferior or at least imperfect workmanship.

Some boiler makers firmly believe that calking should be performed both internally and externally, and we may frequently hear this double calking expatiated upon as adding to the value of a boiler. As a matter of fact, however, internal calking should never be resorted to. By internal calking we mean specially to indicate the calking of edges exposed to steam or water, especially the latter, for long experience has shown with very little room for doubt that internal calking has frequently been either a cause or an aid in the initiation of corrosive channeling of the plates along the line of the rivet seams. Though channeling is commonly met with along the longitudinal seams, being started, more frequently than by any other cause, by the want of perfect circularity of the boiler, yet it is aggravated by the calking of the edge of the plate which borders the channeling, and the explanation is that an abnormal stress is set up in the plate upon which the calked edge is forced down, and too frequently the calking tool itself is driven so severely upon the plate surface as to cause an injury which develops as channeling when other conditions, such as bad water, etc., are present. These causes have been mainly contributory to the modern practice of outside calking only, and with proper workmanship this is all that should be required, but the best practice rejects any calking at all in the strict acceptance of the term, and demands that the edges of the plates shall be planed and "fullered;" fullering being the thickening up of the whole edge of the plate by means of a tool having a face width equal to the plate thick-

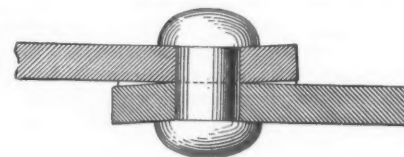


FIG. 1.

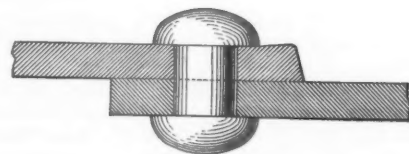


FIG. 2.

ness. With such a tool as this it is impossible to wedge apart the plates forming the joint, as so frequently done in the manner shown (exaggerated) in fig. 1, when the narrow edge of the calking tool, driven perhaps by a heavy hammer, actually forces the plates apart and insures a tight joint only by the piece of damaged plate corner which remains driven fast into the gap.

In contrast to this, fig. 2 may be taken to fairly represent the correct action of the more correct fullering tool, the plate edge being simply thickened, and contact between the two plates rendered certain for some distance in from the edge. To thus thicken, or "fuller" a plate requires considerable power, and yet even the use of a more than usually heavy hammer will not cause injury, as it certainly would do in careless hands, if used with a narrow calking tool. All modern first-class boiler work in England is invariably fullered, and though the practice of inside calking is still followed by firms who "fuller," nevertheless outside work is gaining the day. A further advantage of the "fulling" tool may be named. If inside calking be still practiced, the tendency to cause grooving will be less marked than with the narrow tool, and where, as at times it is absolutely necessary to internally calk, as may sometimes happen, this last is a great point in favor of the broad tool.

The foregoing remarks are suggested by a few notes on calking in an engineering work, wherein calking tools are described as having from  $\frac{1}{8}$  to  $\frac{3}{8}$  of thickness and "best work" as being calked both inside and out. In itself, calking properly carried out and lightly performed on good close riveted joints is not necessarily bad, but too frequently is badly performed by careless workmen and boys, and hence "fullering," which is better practice and is also a safeguard against carelessness, is to be preferred to the old method,



## The Kouts Accident.

The disaster on the Chicago & Atlantic at Kouts, Ind., seems likely to go uninvestigated, so far as any inquiry into the exact location of the blame is concerned. There is no state board of any kind, and the coroner, who appears to be a county officer chosen without regard to fitness for the office has to make his inquiry single-handed and alone. The responsibility, however, is substantially fixed already, as near as any tribunal in this country would be likely to fix it, unless it were one of the best of the state commissions. The company and several of its employees are to blame, and the apportionment of the guilt between the different individuals could be made only by a careful investigation of the men, their habits, the rules they worked under and the manner of enforcing those rules.

The testimony before the coroner bearing upon the essential features of the case was as follows:

Brakeman J. O. Colton, of the passenger train, said that his attention was called to the nearness of the freight train by sparks flying out from the smoke stack (before he saw the headlight). He jumped up and ran back with a signal, and says that he saw the freight when he got near the semaphore. The fireman of the freight in jumping off struck this brakeman.

John Dorsey, the engineer of the freight, said that he received notice at Crown Point (19 miles from Kouts) that the passenger train was disabled. He therefore approached Hurlburt (8 miles from Kouts) carefully, and received a lantern signal from the operator that all was right. At Boone Grove (six miles from Kouts) he saw the operator sitting in the office, the signal standing at "all clear." The fog was first encountered after passing Boone Grove. He shut off steam on approaching the state ditch water tank (where the collision occurred) [apparently before he saw any signal or received any intimation of danger]. He saw the semaphore signal only after he had got very close to it. He then reversed the engine and called for brakes, and says that he met the passenger train's flagman after passing the semaphore.

W. H. Willets, fireman of the freight, says they were running 25 miles an hour, and saw the semaphore a train length before reaching it. He says that the engine had no sand.

Conductor J. B. Parks, of the passenger train, said that he was two hours late, having lost 30 minutes waiting for connections, 55 in disconnecting one side of the engine, and 31 at Boone Grove in passing a freight train. The passenger train had been at the tank about three minutes when the crash came. Conductor Parks says there were 27 passengers on the train, and that he is positive that 18 were got out of the wreck. The semaphore is 1,500 ft. from the tank, and the train was 300 ft. long, which left an available distance of 1,200 ft. for a train to stop in after passing the signal.

John W. Jacobs, brakeman of the passenger train, says that he turned the semaphore signal to red, and then went to help the engine-man bar the engine off the dead centre.

Conductor E. H. Mattice, of the freight, was in the caboose. He says the engine-man blew one long blast (the station whistle signal), 1½ miles before reaching the water tank, and that then he and the brakemen went on top of the train and commenced setting brakes. He says the brakes did not hold well. His train was heavy and about an hour late. Time had been lost in coming up grade, and the road between Boone Grove and Kouts is a place where time is generally made up. [This would indicate that the grade is descending, and that the statements about the high speed are truthful.]

John Kilfoyle, rear brakeman of the freight, says that the rear cars of the train were Armour refrigerators, and that the brakes on them were too stiff to set easily.

The Chicago & Atlantic runs some specially fast freights, the average time being some twenty miles an hour or more, including stops, and the testimony would indicate that this was one of those trains instead of the train which, according to the first reports, "had been passed a few stations back." This high speed without power brakes and, as appears, without any additional safeguards, is specially reprehensible. The keeping of trains a certain number of minutes apart devolves on the operator, but whether this rule was transgressed at either of the stations named does not appear. If the freight gained on the passenger, the question then turns on the rule requiring a flagman to go back whenever a train is losing time. This rule appears in many of the best codes, but it is even harder to enforce than that terrible one requiring the man to go out after a stop has been actually made. No one tries to tell the brakeman how much time he may lose before dropping off, and so he uses his own judgment, or lack of judgment. Many of them break this rule every week.

If the semaphore was erected for any purpose whatever, it must have been to protect this particular stopping place; and if the engine-man had even the faintest conception of it he must have known this. Under these circumstances to approach it as he did in a fog was gross carelessness, and his lack of sand, which he must have known of and which rendered caution still more necessary, added to his culpability. The fact that he "became uneasy" a mile and a half before reaching the point of danger does not extenuate matters much if the weight of train, kind of cars, speed, grade and slipperiness of rails were such as to lead an ordinarily careful runner to know that the brakemen could not stop the train in that distance.

The rear brakeman's testimony concerning the brakes on the Armour cars doubtless means, when interpreted, that the leverage or the size of the brake shoes was entirely inadequate for the braking of such heavy cars.

## Exports of Domestic Merchandise.

The quarterly report of the Bureau of Statistics for the last quarter of the fiscal year ending June 30, 1887, presents the usual tables of exports and imports, shipping and immigration. Among the exports of domestic merchandise are some that are of importance or interest to engineers and manufacturers of railroad supplies, though the classification is not always made for their convenience.

Looking for those items of interest for the last three fiscal years we find the value of the exports has been:

	1885.	1886.	1887.
Carriages and horse cars...	\$1,495,475	\$1,340,196	\$1,454,101
Fr't and passenger cars...	369,053	587,092	653,298

Under the heading of iron and steel and manufactures, we have exported:

	1885.	1886.	1887.
Car wheels.....	\$92,098	\$86,610	\$98,865
Machinery.....	3,794,795	3,685,230	4,697,714
Stationary engines.....	137,675	123,270	213,300
Sewing machines and parts.....	2,898,098	2,581,717	2,212,853
Fire-arms.....	1,700,655	1,774,600	694,233
Locomotives.....	732,403	333,393	373,245

Total manufactures of iron and steel... \$16,574,174 \$15,745,569 \$15,958,502

The number of locomotives exported in 1886 (52) was lower than for any year since 1876, when we exported only 44. In 1877 the number exported was 53, and in 1887, 58, but the value for the last two years was the lowest for which we have any record, the declared values per locomotive having been for 1876, \$12,764; 1877, \$10,723; 1886, \$6,411, and for 1887, \$6,435. The total number of locomotives exported since and including the fiscal year 1875 has been 1,335, valued at \$13,004,497. This does not include some of the locomotives sent to Mexico, as there is no law enforcing the return of articles exported to Mexico by railroad. The distribution of these locomotives was given in the *Railroad Gazette* of March 25.

The following exportations of rails are shown:

	1885.	1886.	1887.
Iron rails, tons.....	1,103	1,104	524
Steel rails, tons.....	\$42,284	\$5,841	\$18,390
value.....	6,853	3,805	2,241
value.....	\$266,401	\$161,631	\$74,330

Few would suppose that during the year in which we were importing over 77,000 tons of steel rails we were also exporting over 2,000 tons of domestic manufacture, and this export must have been due to exceptional facilities for transportation. Of the export in 1885 nearly 6,000 tons went to Canada and was a portion of the 10,000 tons sold to the Canadian Pacific. Our exports were despatched to their destination by the following conveyances:

	1885.	1886.	1887.
By cars and other land vehicles.....	\$21,184,096	\$16,425,361	\$18,784,832
By American vessels, steam.....	33,048,075	31,751,729	33,766,531
"    "    sail.....	45,080,508	44,061,036	37,461,311
"    "    foreign.....	485,741,593	442,536,993	493,884,766
"    "    sail.....	141,028,692	130,587,410	119,185,463

And they were classified as follows:

	1885.	1886.	1887.
Manufactures.....	\$117,219,810	\$135,097,658	\$135,347,574
Agriculture.....	530,172,968	486,134,755	533,074,774
Mining.....	60,151,499	13,635,631	11,758,730
Forest.....	7,588,442	2,663,893	21,192,212
Fisheries.....	5,955,122	5,274,402	5,155,771
Miscellaneous.....	5,554,097	4,760,220	6,570,872

Total..... \$726,682,946 \$665,964,529 \$703,022,923

In 1860 our total exports of domestic merchandise to foreign countries amounted to \$316,242,423, an increase of 103 per cent. The value of our agricultural products that year was \$256,560,972, showing an increase of 104 per cent., and the products of manufacture have increased from \$45,658,873, or 196 per cent.

The products of manufacturing amount to 19.25 per cent. of our exports of domestic merchandise, which is the highest percentage reached, while in 1880, a boom year, it was the lowest, only 9.65. The products of agriculture made 74.4 per cent., in the three preceding years only was the proportion smaller.

The report of the St. Paul, Minneapolis & Manitoba for its last fiscal year naturally presents some large figures. The increase of the average mileage worked is 18.3 per cent.; but the total new mileage for the fiscal year, and up to the end of the season of 1887, will be 95.5 per cent. of that in operation June 30, 1886. This includes, however, 262 miles to be graded only. The increase in freight train mileage was 27.3 per cent., in tonnage 18.5, in ton mileage 20.2, and in earnings from freight business 10 per cent. The average haul was shortened 4.4 per cent., and the average receipts per ton per mile decreased from 1.44 cents to 1.36 cents. The passenger rate also declined from 2.44 cents to 2.24. There is nothing in the report to indicate what part, if any, of the increased freight movement and earnings was from construction material carried. This was a very large item in the business of the road unquestionably, as the activity in construction has been so great. No details are given of expenditure for new road. The increase in the item of "road, equipment and lands" in the general account is about 11 million dollars, and the funded debt is increased by about the same amount. The increase in road and equipment when completed will add some \$960,000 to the annual fixed charges of the road, or 30 per cent. The dividend payments the last two fiscal years have taken \$1,200,000 for 6 per cent. on the capital stock of 20 millions. Before that the dividends were 6½, 9½, 8 and 6½ per cent. each year from 1882 to 1885, inclusive. The great increase in fixed charges which now comes at the same time with diminished rates will necessitate extraordinary earnings if the old dividends are to be kept up, and good as the country may be along the new Montana line, it is too much to expect that it will fill up very fast, in the present state of the wheat and stock raising industries. The completion of the Montana Central will soon enable the Manitoba to compete for the trade of Helena, and the President suggests that sound policy will require the prompt extension of the Montana lines in the future. The extension of the company's lines to Lake Superior will probably not be long delayed. It owns a controlling interest in the Lake Superior & Southwestern, through which its terminal facilities at West Superior have already been increased. It has been announced that this latter company is to build to Clear Lake, and thence "to Kansas City and Omaha." If its real object

is to provide an outlet for the Manitoba on Lake Superior, that can be accomplished by a line of 75 miles or less to Hinckley, instead of 150 miles to Clear Lake.

The Duluth, South Shore & Atlantic has track laid to the Sault Ste. Marie on the east and to near the Gogebic Lake on the west. The contract for the Sault bridge calls for its completion by Nov. 1, and the Canadian Pacific trains will soon cross it. It is expected that the Duluth, South Shore & Atlantic will make connection with the Milwaukee, Lake Shore & Western and with the Northern Pacific in December. Trackage rights have been secured, it is said, over the Northern Pacific to Superior City and Duluth. About the time of the close of lake navigation, therefore, one of the great new railroad routes from the Northwestern wheat-fields to the Atlantic coast will be open, and Duluth will have a winter outlet. This new road is thought to be well prepared for the important place it is expected to take in the chain of communication. Grades have been kept below one per cent., and much expensive work has been done to secure that end. But the Canadian Pacific will not take all the Duluth trade thus opened. The Michigan Central is in the field and is preparing to increase the efficiency of its service across the straits of Mackinaw.

In the table below we give the receipts of wheat from Aug. 1 to Oct. 8, at four ports, by way of showing the relative importance of Duluth as a wheat port. The quantities are in thousands of bushels:

	Total.	Highest.	Lowest.	Week ending Oct. 8.
Duluth.....	3,055	623	31	687
Chicago.....	2,726	306	223	296
Milwaukee.....	1,562	334	71	314
St. Louis.....	4,663	1,096	151	152

In the weekly receipts, Duluth has gained rapidly and steadily since the beginning of the crop year, Chicago has changed but little, Milwaukee has gained and St. Louis has declined. Of course these are the results to be looked for as the Southern wheat moves first; but it should be borne in mind that the Duluth receipts have probably not yet reached their maximum. It is thought that the bulk of wheat shipments from St. Paul and the country north and west have gone to Duluth rather than Chicago or Milwaukee, as the rates have been favorable.

The Governor of New Hampshire has vetoed the Hazen bill, and the House Committee sustains the veto by a vote of 7 to 5. The next step in the contest is not yet apparent. A part of the veto message is given in another column. The indignation of the Governor seems, from the reports that reach us, to be well founded. It is suggested, however, that without evidence other than that which has been made public the Governor is hardly warranted in "going behind the returns" and impugning the motives of the legislators who voted for the bill; but whatever more or less technical criticism may be made on his action, honest men everywhere will be glad of the lesson which his veto carries, that even a suspicion of corruption should damage the cause on which it rests. The pity is that Governor Sawyer's veto punishes but one party to the contest, while accusations are made apparently with equal force against both. In saying this we do not wish to be understood as judging either of the corporations involved in this struggle. Perhaps neither of them has tried to bribe the law-makers.

The Italian railroads are making large additions to their equipment, orders having been placed since May last for about 150 locomotives and 4,000 cars. Some 2,500 cars are ordered from Italian works, the balance from foreign shops. Our works should have secured orders for a portion of this rolling stock, and experience with our cars and locomotives would extend their use in Italy and on the Continent. There is an unfortunate tendency to know nothingism apparently inherent in the Anglo-Saxon and allied races, which crops out not only where imported labor interferes with the price or opportunity of home labor, but where it is supposed to interfere with any interest. One instance, among others, of this feeling may be seen in a late number of the *Contemporary Review*, where the writer objects to the employment given to clerks from the Continent in English counting houses, that they, settling in English colonies, induce their governments to establish subsidized lines of steamers which divert commerce to continental ports. Our commerce is nearly beyond further injury by efforts of that kind, nor would any of our interests suffer, it is thought, from introducing young men from possible customer nations into our shops and factories, and teaching them trades; for if they stayed here we would have their services, and if they returned to their homes they would to a great extent become agents for the sale of our rolling stock and machinery. But between the rules of trades unions and the prejudice against foreigners in any new occupation, it would be difficult to introduce a lot of young Italians say, into a locomotive works as apprentices. General J. H. Wilson, in his "Travels in the Middle Kingdom," recommends the education of Chinese youth at Annapolis and West Point as a possible gracious act by our government, and one likely to be of advantage to the material interests of both countries. But like both countries would probably receive more good by the education of an equal number in our locomotive car and machine shops. So large a proportion of our commerce has lately been with nations which are nearly or quite our equals in technical knowledge or financial resources, that we have apparently forgotten a fact which is fully recognized elsewhere, that the largest profit is found in trading with the nation which pays with raw produce—or, commercially, the poorest nation; and it may be doubted if such trade could be



fostered better than by sending back to those countries natives trained in our shops to understand the superiority of their products.

The Inter-state Commerce Commission has issued a circular to say that the subject of annual reports to be required under Section 20 of the act will be considered in a public session, to be held in Washington, Oct. 26. Suggestions sent to the Commissioners will be considered, and any person who desires to confer with the Commission on that subject will be heard. The Commissioners may at their discretion prescribe a uniform system of accounts, and may fix the time within which carriers shall be required to have their accounts conform to the system. The Commissioners may also fix the time when the annual reports shall be made. It is to be hoped that state railroad commissioners, who have been specially invited to this hearing, will take an interest in the subject and be fully represented. The problem is most intricate and involved, as all interested know; the failure to get information desired, and the waste resulting from statistics collected, because other roads or states failed to produce anything with which they could be compared, has long been a constant vexation to all investigators. The task of formulating anything like a uniform system, though beset with so many apparent impossibilities, ought to yield to perseverance and courage, nevertheless; and now is the time to attack it.

In our technical notes will be found the results of the ballot of the Master Car-Builders on standards and note of important action of the executive committee. It will be seen that the resignation of Secretary Forney was not accepted. Attention is called particularly to the appointment of a committee to critically examine the couplers coming within the Master Car-Builders' type, and to report on the second Thursday in January. The executive committee is to be congratulated on having adopted a non-partisan name for the type. The ground is further cleared.

It is stated by the Boston papers that the Boston & Providence will be leased to the Old Colony, the rental to be 10 per cent. on the capital stock. It is also rumored that the Old Colony will give the Providence stockholders a bonus of \$1,000,000 in bonds. While this last seems highly improbable, the reports taken together seem to have some truth, and to give definiteness to various rumors that have been floating about for some time. The consummation of this scheme would have important bearings on New York-Boston passenger traffic.

The Minnesota law requiring fire extinguishers in passenger cars seems to be widely disregarded. The State Commission, after noticing many unequipped cars, gives its third warning to the companies, and tells them that the Attorney General will be notified to proceed against them if cars are not equipped by Nov. 1. A function of commissions is to give publicity to irregularities, and it has been generally supposed that this could be depended upon as an effective corrector of evils, but the Minneapolis Commission does not seem inclined to stop there.

Last week we noted the project of a railroad from Los Angeles to Salt Lake City. Now we have news of another, a rival road, to be built from San Pedro Harbor by Los Angeles and Pasadena, through Kern and Inyo counties, past Owens Lake and through Nevada and Utah to a connection with the Union Pacific, or rather with the Utah Central. Of this 60 miles are graded and 10 miles built. The projected line is about 320 miles.

#### Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887, not before reported, is given as follows:

*Chateaugay*, from Loon Lake, N. Y., westward, 8 miles.  
*Chicago, Burlington & Quincy*, Oxford & Kansas road, from Orleans, Kan., to the state line, 60 miles.  
*Kansas City & Southeastern*, from Westport to Waldo Park, Mo., 6 miles.

This is a total of 74 miles heretofore unreported, making 6,253 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

Miles.	Miles.	Miles.	Miles.	Miles.
1887... 6,253	1888... 4,947	1879... 2,739	1875... 986	
1886... 4,551	1882... 8,314	1878... 1,635	1874... 1,363	
1885... 1,870	1881... 5,639	1877... 1,968	1873... 3,075	
1884... 2,932	1880... 4,388	1876... 1,875	1872... 5,975	

This statement covers main track only, second or other additional tracks and sidings not being counted.

#### NEW PUBLICATIONS.

*The Vanderbilt System* is the title of an elegantly printed and bound volume issued by the Boston & Albany, New York Central, Lake Shore, Michigan Central and the roads controlled by these, giving information for both passenger and freight patrons. Names of officers, particulars of freight facilities, equipment, fast freight lines, routes, etc., are given for shippers, and descriptions of scenery, sketches of cities and towns, maps, etc., for passengers. There is a profusion of excellent wood-cut engravings and numerous handsome Albertype views of scenery at Niagara Falls and elsewhere.

#### TECHNICAL.

##### The Rail Market.

*Steel Rails.*—The market continues dull, and only a few sales have been made for 1888 delivery, the report of the Board of Control stating the orders up to Oct. 1 to aggregate about 42,000 tons, this being only about 14,000 tons of new business. The allotment for 1887 was 1,988,929 gross tons, of which 1,833,126 tons had been placed up to Oct. 1, and the shipments to that date were 1,390,825 gross tons. During

last week one sale of 1,500 tons, early delivery, is reported, at \$34.50. Quotations, \$34@34.50, according to time of delivery.

*Old Rails.*—Market quiet, only one sale of a lot of 300 tons being reported, at private terms. Quotation, \$22@32.50 for tees.

*Scrap.*—Sales to one consumer were made this week, aggregating about 1,000 tons at \$20.50@22.50 delivered. Quotations, foreign, \$20.50, and domestic, in yard, \$21@22. *Rail Fastenings.*—Quotations: Spikes, 2 25@2.40c.; angle bars, 2.10@2.20c.; bolts and nuts, 3@3.25c.

**Traction Increases and Over-cylindrical Engines.** A committee of the Master Mechanics' Association, Messrs. Barnett, Wanklyn and Hatswell, send out the following circular. Answers are to be sent to J. Davis Barnett, Mechanical Superintendent Grand Trunk, Port Hope, Ontario:

1. Can the defect of an over-cylindrical engine be best remedied—

(a) By the application of a traction increaser; or  
(b) Would you in preference recommend that the cylinders be lined with a steel bush (a practice common in marine service); or

(c) That additional dead weight be judiciously distributed over all driving wheels; or

(d) That a lower boiler pressure be used with an altered ratio of steam expansion?

2. If you approve of use of a traction increaser on the standard American engine, would you also recommend their application to Mogul, Consolidation and Decapod engines? If not, why would you restrict their application to four-wheel-coupled engines?

3. Having equipped an engine with traction increaser would you dispense with sand and sand box?

4. (a) In your opinion does a traction increaser practically lengthen the engine wheel base, thereby increasing the locomotive resistance on curves?

(b) Can you quote an experiment showing the difference in haulage capacity of an engine so equipped—first on tangent and then on curve?

(c) If you have an engine equipped, will you try this experiment and communicate the results?

5. If traction increasers are of acknowledged use in case of emergency, is there any reason why they should not be used continuously, and thus utilize each trip the advantage of the increased haulage capacity (this being the service for which patentees claim that traction increasers were designed)?

6. If they are useful at low speeds, is there any reason why they cannot be made just as useful at high speeds?

7. (a) Are you familiar with any schemes for increasing traction other than those known as Dees, Purves, Craven (automatic traction draw-bar) and the Locomotive Improvement Company's?

(b) Would not the simple application of screw and lever (as used in European practice to increase the weight on a single driving axle) accomplish the desired end as effectively as the above-mentioned designs?

8. Have engines, regularly using traction increaser, developed any special failures in springs, spring gear, side rods, cylinders, loose tire or special wear on tires, or in cracks in frame, horns and horn stays?

9. Give any information possible as to first cost, cost of application and cost of repairs to traction increaser, also additional outlay or estimated saving in the cost of general repairs of engines fitted with the traction increaser?

This committee would like to have their report in the hands of the executive not later than the last day of April, 1888.

#### Extension Smoke Boxes, and Brick and Other Fire-box Arches.

A committee of the Master Mechanics' Association, Messrs. Hickey, Foster and Weisberger, send out the following circular under date of Oct. 13. Answers are to be sent to Mr. John Hickey, Master Mechanic Milwaukee, Lake Shore & Western, Kaukauna, Wis.:

It is a recognized fact that the railway interest of this country is passing through a crisis unequaled in its history, and it is plain that it becomes the duty of all interested to aid in its safe passage. The fuel consumed by locomotives, together with the expense of adjusting fire claims, caused by fire thrown from locomotive stacks, are two of the largest items of expense connected with railway operations.

"Extension smoke boxes and brick and other fire-boxes" is a subject bearing directly on the above points, and it is asked as a duty of each and every member of the Association and of all having charge of railway machinery, to assist the Committee in getting out an intelligent and reliable report by answering as clearly and fully as possible the following questions:

1.—What kind of fuel is used on your locomotives, hard coal, soft coal or wood?

2.—What is the average amount of water evaporated per pound of the coal you are using?

3.—What is your average cost per locomotive mile for fuel?

4.—What form of smoke-box issued on your locomotives?

5.—Have you had any experience with the so-called "Extension Fronts"? If so, please give dimensions of the same, with sketch showing location and kind of netting, and situation of deflector plate, if any used, also situation of exhaust nozzles and arrangements for discharging sparks.

6.—What form of smoke-stack do you use in connection with the extended front? In the same connection, please state size of engine cylinders, size of nozzles, dimension of fire-box and number of flues.

7.—Do you advocate the use of single nozzle in connection with the extended front?

8.—Have you had any experience with a device in the ordinary box that would accomplish the same end as that claimed for the extended front? If so please state results obtained and send drawings of the same, and state if in connection any extras are used in fire-box as well as showing smoke stack construction.

9.—Do you favor the use of a draft or petticoat pipe in connection with the extended front?

10.—What is the amount of additional weight caused by extended front and attachments?

11.—How do you regard the old style smoke box and diamond stack in economy of maintenance, economy of fuel and prevention of fires as compared with the extension front and attachments?

12.—Have you used a fire-brick arch or other device in fire box in connection with extended front? If so please give dimensions of same, with sketch showing the device and manner of sustaining it, and the results obtained as compared with the plain fire-box in the same connection.

13.—Do you favor the use of a brick or other arch in the fire-box of a locomotive using bituminous coal, and can you say from experience that the advantage gained thereby will warrant the expense of maintaining such arch?

14.—Have you noticed any injuries to fire-box sheets resulting from the use of a fire-box arch? Please send drawing of the fire-box grates used in connection with your extended front.

15.—Under what circumstances, if any, do you advocate the use of hollow stay bolts in fire-box for the purpose of admitting air above the fire?

16.—All things considered, do you favor extended fronts on locomotives as now generally constructed? If not please state objections.

Please do not confine yourself to the questions asked, but with your advice and aid of drawings give the committee any information you may possess bearing on the subject.

#### The Frost Light on the Pennsylvania.

As the result of long and exhaustive experiments, the Pennsylvania road has adopted the "Frost Carbaretter Light," which is controlled by the Railway Lighting & Heating Co., of Philadelphia, as its standard for train lighting. This lighting system was shown in the *Railroad Gazette* March 26, 1886. The Pennsylvania has in regular service 25 cars with this light, which is also used on Vice-President Thomson's car. The Norfolk & Western has in service 12 cars with the Frost light, and the Railway Lighting & Heating Co. has an order to equip the President's car and 11 more passenger cars for that road.

#### The Dudley Dynagraph Car.

P. H. Dudley's dynagraph inspection car made trips over the Connecticut River and the Boston & Maine roads during the past week.

#### A Canadian Enterprise.

English capitalists, including Mr. Greathead, civil engineer, of London, who is at present building the London & Southwark Subway, have made a proposition to the Dominion Government to complete the eight-mile submarine subway across Northumberland Strait, dividing Prince Edward Island from the mainland. The proposition is to take the Prince Edward Island Railway off the hands of the government and operate it on a tariff to be approved by the government. The plan embraces a subsidy of \$200,000 per year for fifty years. In connection with the scheme an announcement is made for the first time of the immense advantage to be obtained from this new scheme in making a direct line to the seaboard by running trains over the short line and utilizing the subway and Prince Edward Island Railroad to Georgetown, thereby making a saving of not less than 672 miles of water passage and 24 hours of time in a passage from Montreal to Liverpool.

#### The Standard Coupler.

OFFICE OF THE MASTER CAR-BUILDERS' ASSOCIATION, 45 BROADWAY, N. Y., Oct. 19, 1887.

The following resolution was adopted at the last meeting of the Executive Committee:

Resolved, That a sub-committee of five be appointed to critically examine the different forms of couplers coming within the Master Car-Builders' type, and report the result of their examination to the Executive Committee on the second Thursday in January, 1888, for their further action. Messrs. Wall, Wade, Lentz, Cloud and Forney were appointed the Committee.

#### The Standards of the Master Car-Builders' Association.

The following is the circular sent out Aug. 10 for letter ballot, and the results of the canvass of the ballot are also given:

At the last convention of the Master Car-Builders' Association it was agreed to submit the following recommendations for decision by letter ballot:

I. That the Janney type of coupler be recommended as a standard form of coupling.

II. That the "rigging" shown by Plate I. of the engraving herewith be the standard of the Association for non-automatic draw gear.

III. That the axle, journal-box, journal-bearing and Journal-bearing wedge, shown by Plates II., III., IV. and V., be the standards for those parts of freight cars of 60,000 lbs. capacity.

IV. That the following dimensions be the standard sizes for lumber for the principal members of car bodies: For 34-ft. box, stock and flat cars, capacity 40,000, 50,000 and 60,000 lbs.

#### Under frame.

6 long sills..... 5 x 9 in., finished Norway pine.  
2 end "..... 7 x 9 " " oak.  
2 cross ties..... 4 x 9 " " oak.  
4 draw timbers..... 4 1/2 x 7 1/2 " oak.  
Flooring..... 1 3/4 in. thick, 5 to 10 in. wide, Norway pine.

#### Upper frame.

(For the same cars as above, excepting flat cars.)  
8 door and corner posts..... 4 x 4 1/2 in., finished oak.  
24 pieces intermediate posts and braces 4 x 3 " " "  
2 end plates..... 3 x 12 " " "  
4 draw timbers..... 4 1/2 x 7 1/2 " " "  
10 carlines..... 1 3/4 x 9 " " "  
2 side plates..... 3 x 7 " Norway pine.

A meeting of the Executive Committee of the Master Car-Builders' Association was held in New York on Oct. 13, 1887, and the letter-ballots relating to the adoption of various standards were canvassed.

On the adoption of the Janney type of automatic coupler as the standard of the Association there were 474 votes in favor and 194 against. It was, therefore, declared adopted.

None of the other standards submitted to letter-ballot received the requisite two-thirds vote, and, therefore, were defeated.

The resignation of the Secretary of the Association was considered and the Committee unanimously refused to accept it.

#### The Edwards & Dennison Car-Heater.

This heater was tested in the presence of a number of railroad men at the store of Williams, Page & Co., Boston, last week. The heater is about the size of the ordinary car stove and is built of wrought iron. Cold air as it enters the heater passes through water and is freed from dust; then it passes through pipes surrounding the fire-box into the hot-air chamber, whence it goes in pipes through the car, a valve at each seat allowing hot air to escape and maintain an equal heat throughout the car. The stove is so constructed that if it is overturned, sliding valves will protect the door and the smoke-pipe opening and prevent the escape of any burning coals, while a reservoir of water—which is beneath the stove in its natural position—sends out numerous small streams of water, which soon extinguish the fire. In the test this afternoon the smoke pipe was removed and the stove suddenly overturned, rolled over and over across the room, tipped up on its head, and then upset again. Not a piece of coal escaped, and in three minutes the water had quenched the fire. In a recent test the heater was thrown down two flights of stairs, and no coal escaped.

#### San Mateo Dam.

The San Mateo dam (California) is notable on account of its height, 170 ft.; and its material, concrete, and its not being a monolith, but built of blocks molded in place, or *in situ* according to the terminology of the New York Dock Department. According to a non-technical correspondent of the *New York Tribune* the concrete is made from Portland cement, 1 bbl.; sand, 2 bbls.; sandstone, broken to the size of walnuts, 22 cu. ft.; mixed in a Gilmour concrete mixer. The plan of the dam is curved; radius, 637 ft.; width on top, 20 ft.; up stream slope, 1 ft. on 3 in.; down stream slope, 2 ft. on 3; height, 170 ft. It is built for the Spring Valley Water-Works Company, of San Francisco, Cal.; Herman Schlusser, Chief Engineer. It has 24 square miles gathering ground, is intended to impound 32 billion gallons and will flood 1,800 acres. The dam abuts against sandstone hills, through one of which is the outlet tunnel and gate shaft, which is entered by four tunnels, each one 35 ft. above the



other and controlled by gates. The Spring Valley Company has three other ponds with an aggregate storage capacity of 12,000 million gallons, and it is proposed to connect the valleys of the San Francisco, Pescadero, San Gregorio and Calaveras with the San Mateo watershed, above the dam, giving an additional gathering ground of 220 square miles.

#### Western Society of Engineers.

At a meeting of this society held Oct. 4, Mr. Moritz Lassig, bridge builder, of Chicago, and Mr. George H. Bremner, Assistant Engineer Chicago, Burlington & Quincy, were elected Members.

Mr. S. P. Morehouse offered his resignation as Secretary. Mr. Lundie presented a paper containing a formula for the economical proportioning of bridge trusses.

#### The Time Service of the United States Naval Observatory at Washington.

The programme of the Time Service of the United States Naval Observatory is as follows:

Daily noon signals over the wires of the Western Union and Baltimore & Ohio telegraph companies (Sundays excepted).

Correction, daily, of the clocks upon the Observatory Department time lines in the city of Washington.

Dropping, daily (Sundays excepted), of time-balls at noon of the 75th meridian at the following points:

Wood's Holl, Massachusetts, under the auspices of the Fish Commission.

Newport, Rhode Island, under the auspices of the Torpedo Station.

New York City, under the auspices of the Western Union Telegraph Company.

Philadelphia, Baltimore, New Orleans, under the auspices of the Hydrographic Office.

Washington, Hampton Roads, Savannah, under the auspices of the Observatory.

Time-balls will also be dropped from the Branch Observatory at the Navy Yard, Mare Island, on Telegraph Hill, San Francisco, through the branch hydrographic office, and at the Navy Yard, at noon of the 120th meridian, daily (Sundays excepted).

The Time Service will be extended to such other points as may be deemed best, as funds will permit.

The time sent from the Observatory is that of the 75th meridian, or Eastern standard time. The transmitting clock is set daily at 11:40 a. m., and its beats are transmitted automatically over the various wires connected with the observatory, beginning at 3 1/2 minutes before noon and ceasing at noon. At the Washington offices of the telegraph companies all of these beats are received; but at points outside the city a less number will be received, owing to the fact that time is necessarily occupied in the manipulation of switches. Beginning at 3 1/2 minutes before noon (11 hrs. 56 min. 45 sec.), each second is registered upon the sounder, with the following exceptions:

The 29th second of each minute is omitted;

H. M. S.	H. M. S.
from 11 56 54 to 11 56 59	the beats are omitted.
11 57 54 to 11 57 59	
11 58 54 to 11 58 59	
and from 11 59 49 to 11 59 59	

In other words, the last 10 seconds before noon and the last 5 seconds of each of the preceding minutes are omitted. It is only necessary then for the receiving operator to observe when a single beat is omitted, by which it is known that this is a half-minute signal. Counting the beats thereafter, beginning with 30, if the count extends beyond 50, it is known that there are still additional signals to be received. Should the count cease at 50, it will be known that the next signal will be that indicating noon, and during the intervening 10 seconds switches to time-balls, control-clocks, etc., should be manipulated.

At points using Central Standard Time (that of the 90th meridian) the signals will be 1 hour earlier.

#### THE SCRAP HEAP.

##### Three Round Trips to the Moon.

Conductor Wilbur, of the North Adams Branch of the Boston & Albany, has run on that road 44 years, part of the time on the main line, running through from Boston to Albany. He has had very few vacations and estimates that he has averaged 125 miles per week-day for the whole time. An educated drummer on the train recently figured out that Mr. Wilbur's mileage would equal nearly seven times the distance from the earth to the moon.

When Mr. Wilbur rides over the Boston & Albany's present four-track road out of Boston, lined with residences and other buildings continuously for ten miles, he doubtless sees something of a contrast to the surroundings that were familiar to him in 1843.

##### Badly Scared.

Young Charlie Parmalee, of Ansonia, Conn., had a tremendous scare the other night. He was walking on the railroad track after dark and caught his foot between a plank and a rail at a crossing. While trying to get free he heard an approaching train. As he struggled it came nearer and nearer until just as he made up his mind for death, the headlight showed him that he was on a side track and not on the main line.

##### Veto of the Hazen Bill.

The Governor of New Hampshire returned the Hazen bill back to the House Oct. 18, with a veto message, some extracts from which are given below: The Governor says that without entering upon the intrinsic merits of the measure, he is moved to object to the bill for the reason that corrupt methods have been extensively used for the purpose of promoting its passage. "The two powerful railroad corporations which have antagonized each other in the contest have had in attendance a paid lobby of unprecedented magnitude and as a consequence the representatives have been persistently followed and interfered with in the performance of their legislative duties. The widespread rumors and scandalous tales of bribery and corruption which have been freely current during the progress of the contest finally materialized through charges preferred in the House. The provision of the Constitution limiting the time within which the Executive veto may be interposed together with the probable early adjournment of the Legislature forces me to take action upon the measure without waiting for the completion of the investigation and the report of the committee. The evidence thus far obtained is, in my opinion, sufficient to justify the action here taken.

"While I am glad to say that no evidence has yet been produced to show that any member of the Legislature has been unfaithful to his trust and oath of office, yet to my mind it has been conclusively shown that there have been deliberate and systematic attempts at wholesale bribery of the servants of the people in the Legislature. It matters not that both of the parties are probably equally guilty. The fact that this bill, if it should become a law, would go on the statute book carrying with it the suspicion that it had been fraudulently enacted is a sufficient reason why it and all legislation similarly effected should be condemned. . . . In such a degree as these corrupt practices are allowed to pass unnoticed, the moral sense of not only legislators but of the

people will become dulled to the enormity, and in the end make government a farce and an object of contempt. As the honor of the individual should be above price, so, in a large sense, should the honor of a state be jealously guarded. Being strongly impressed that the honor and good name of the state and its Legislature are involved in countenancing the methods that have been practiced to secure the passage of this measure, and that all other considerations should be put aside, and feeling that my duty is plain, I veto the bill."

#### Commendable Caution.

The Michigan Central had 25 miles of road in the upper end of the peninsula which ran through the heart of a big forest fire, and 150 men were kept patrolling every foot of it night and day last month to avert a Chatsworth disaster. —*Toronto Monetary Times.*

#### Another Burning Bridge.

An east-bound train on the Wabash with a large number of passengers had a narrow escape from destruction on the night of Oct. 16 just before the long bridge near North Morenci, Mich., was reached. The engineer made the discovery that the structure was on fire and succeeded in stopping his train. A number of road men extinguished the flames and repaired the bridge and after a delay of 2 hours the train proceeded.

#### The Case of Section Foreman Coughlin.

The case of Timothy Coughlin, indicted by the coroner's jury for the Chatsworth (Ill.) railroad accident, was taken up on Oct. 14 by the grand jury and disposed of. The indictment was ignored, the evidence not being deemed sufficient by them to find a bill.

#### President Cleveland's Peril.

The press dispatches have the following:

The presidential party had a narrow escape on their way to Memphis, Tenn., last week. When the train arrived at a trestle between Bonnaville and Jonesboro, Ark., the trestle was seen to be on fire. As soon as possible the train was stopped, though not before the engine had passed over the burning portion. The engineer found that a section about 10 ft. square was in flames and that the fire had been started on the under side of the timbers. The fire was soon put out, when it was discovered that the flames had not eaten dangerously far into the wood and the trestle was still safe for the passage of trains. A careful examination of the burned timbers was made, which gave unmistakable evidence of an attempt at train-wrecking. The fire was started on the under side of the cross-ties in such a manner that there can be no possible belief that sparks were the cause of it. Then, too, the fire was certainly set to more than one tie at a time, for it could not have jumped from one to another without burning the sides of the timber more than it did.

Another account says that the fire was discovered by a pilot engine.

#### The Turn of the Tide.

Robbers attacked a Southern Pacific train near El Paso, Tex., on Oct. 14, but failed to reap the rich reward usually attending such Texas escapades. In fact, the climax of this particular attempt at robbery told to the disadvantage of the marauders. The door of the express car was successfully shattered by a dynamite bomb. But the first man who advanced through the opening was filled with buckshot from a gun in the hands of J. Ernest Smith, the messenger, and the army of Texas train robbers was made less by one. Two companions of the unlucky member of the brotherhood ran with all their agility away from the second shot from the agent's gun, and the train was put back to El Paso with its complete and the dead bandit on board.

#### Old Heads.

The Hartford *Courant* has a word about old conductors, and speaks in compliment of Conductors Williams, Downer and Saunders of the New London road. Horace H. Saunders began work with the old New London, Willimantic & Palmer Railroad Co. Oct. 1, 1859. In 1866 he was given the run through from New London to Palmer, which position he has since held with faithfulness and honor. He carries an elegant gold watch as a gift from his numerous friends. Conductor Downer of the mail train and conductor Williams of the steamboat train, began their railroad life a few years earlier, soon after the road was completed, and are equally trustworthy men. The Norwich & Worcester produces four conductors who have grown gray in the service of that road. Messrs. Albert Roath and T. N. Turner have been conductors thirty-seven years or more, and J. H. Chaffee since 1854; and A. E. Davis for twenty-five years.

#### A Conductor's Brutality.

On Oct. 14 a boy named Burroughs, about 17 years of age, hailing from Sherdan, Mich., was found in the Union Station Yards, at St. Paul, Minn., badly mangled. He was removed to the City Hospital, and early Saturday morning the injured limb was amputated at the thigh by Dr. Spencer. The same day Burroughs died. Shortly before the lad died he stated to Dr. Spencer that he had boarded a Chicago, Milwaukee & St. Paul passenger train without a ticket. The conductor came around and inquired for his ticket, but was informed that he had none, and thereupon the conductor told him he must jump off. This he expressed a willingness to do, but asked the conductor to wait until the train stopped. This request the conductor refused, and the boy, according to his story, was taken to the platform of the train and violently thrown off. In falling he struck against a switch, which threw him partially under the train, and the cars passing over him, crushed him.

Dr. Quinn, the County Coroner, after making inquiry into the case, has decided that there is sufficient in it to warrant the holding of an inquest. He has accordingly notified the railway authorities to gather up the train gang who were running the passenger train when Burroughs was injured, and have them attend the inquest. Dr. Aucker, the city physician, says the railroad company refused to have anything to do with the expenses in the case. —*Exchange.*

#### How an Engineer Would Run a Paper.

A great newspaper is a mighty engine. (I guess I am not the first man who has said that, but —) If I were to run such an engine—a real, literary, political, social, moral locomotive—I'd fill her with the coal of conviction and the water of candor and get up the steam of enthusiasm. Then I'd grasp the lever of intention with the hand of justice and run her out upon the main track, hook into the leading ideas, open the sand-box and pull out for the next station on the road of progress, leaving the dead from the last disaster to be buried by those who love to linger about the deserted stations of the past. Steam would be reversed on account of warnings from ahead, but never on account of wailings from behind. —*Exchange.*

#### General Railroad News.

##### MEETINGS AND ANNOUNCEMENTS.

Meetings of the stockholders, of railroad companies will be held as follows:

*Eastern Illinois & Indiana State Line*, special meeting, at the office, Chicago, Ill., Oct. 31.

*Monmouth & State Line*, special meeting, at the office, Chicago, Ill., Oct. 31.

*Cincinnati, Indianapolis, St. Louis & Chicago*, annual meeting, at the office, Indianapolis, Ind., Oct. 25.

*East Tennessee, Virginia & Georgia*, annual meeting, at the office, Knoxville, Tenn., Nov. 16.

*Indiana & Western*, at the office, Indianapolis, Ind., Nov. 10.

*Northern Pacific*, meeting of preferred stockholders, at the office, New York, Nov. 5.

#### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Atchison, Topeka & Santa Fe*, 1 1/2 per cent., quarterly, payable Nov. 15.

*Boston & Albany*, 2 per cent., quarterly.

*European & North American*, 2 1/2 per cent., quarterly.

*Pullman Palace Car Co.*, quarterly, 2 per cent., payable Nov. 15.

*St. Paul, Minneapolis & Manitoba*, 1 1/2 per cent., quarterly, payable Nov. 1.

*Sioux City & Pacific*, 3 1/2 per cent. on preferred stock.

#### Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *New England Railway Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

#### Brotherhood of Locomotive Engineers.

The Brotherhood of Locomotive Engineers began their 24th annual convention with public exercises in the Central Music Hall, Chicago, on Oct. 19.

#### Street Railroad Convention.

The Fifth Annual Convention of the Street Railway Association of America met in Philadelphia on the 19 inst. About 150 members were present. Mr. William Wharton, Jr., read a paper on electricity as a motive power and Mr. D. Atwood a paper on cable propulsion. Mr. C. A. Richards read a paper on roadway construction.

#### Boston Railroad Clerks' Association.

At the annual election of the Boston Railroad Clerks' Association held this week, the following officers were chosen: President, E. B. Chamberlain, New York & New England; Vice-President, A. B. Averill, Fitchburg; Treasurer, F. H. Reeves, Boston & Lowell; Secretary, W. S. Wilcombe, New York & New England. Executive Committee, C. W. Trask, Railway Clearing House; D. W. Bates, Boston & Providence; J. P. Manning, New York & New England; Gilbert Hodges, Boston & Lowell; M. R. Perry, New York & New England; G. E. Carley, Boston & Lowell; A. A. Lawson, Boston & Lowell. Finance Committee, C. A. Huntington, New York & New England; M. T. Burnett, Boston & Providence; and E. G. Preston, Boston & Lowell.

#### Railroad Brakemen's Convention.

The Brotherhood of Railroad Brakemen began its fourth annual convention in Binghamton, N. Y., on Oct. 17. About 300 delegates are congregated there from every section of the United States and Canada. There was a grand parade on the afternoon of the 17th, with about 2,000 men in line, including members of the city government, militia companies, trades unions, benevolent societies, the Brotherhood delegates and others. After the parade Mayor Bayless delivered an address of welcome at the Opera House, and Grand Master S. C. Wilkinson, of Peoria, Ill., read his annual address. Speeches were also made by Edmund O'Connor, of Binghamton, and E. V. Debbis, of Terre Haute, Ind., Grand Secretary of the Brotherhood of Locomotive Engineers. The sessions will be secret and will last about ten days.

#### PERSONAL.

—J. T. Odell has resigned the position of Assistant General Manager of the Northern Pacific.

—J. M. Willard, City Engineer of Pasadena, Cal., has been appointed Chief Engineer of the San Pedro, Los Angeles & Utah.

—J. W. Sherwood, General Superintendent of the Cincinnati, Indianapolis, St. Louis & Chicago, has severed his connection with that company after a service of 18 years. He began as a telegraph operator.

#### ELECTIONS AND APPOINTMENTS.

*Arcade*.—The directors of this New York company elected the following officers this week: Ex-Vice Charles P. Daly, President; ex-Secretary William Windom, Vice-President; Melville C. Smith, Second Vice-President and General Manager; George S. Coe, President of the American Exchange Bank, Treasurer, and Eugene W. Austin, Secretary.

*Atchison, Topeka & Santa Fe*.—E. H. Davis has been appointed District Freight and Passenger Agent for Southwest Kansas.

*Buffalo, Rochester & Pittsburgh*.—Alonso Dolbeer has been appointed Superintendent of Motive Power vice C. W. Mills, resigned.

*California Southern*.—The Auditing Department of this and the California Central Co. have been transferred from National City to San Bernardino, Cal.

*Central Pacific*.—President Cleveland has appointed Thaddeus C. Pound, of Chippewa Falls, Wis.; George Stoneman, of Los Angeles, Cal., and Theodore Cook, of Cincinnati, O., commissioners to examine two sections of the railroad and telegraph line recently constructed by this company.

*Chesapeake & Ohio*.—J. T. Odell has been appointed Superintendent.

*Chicago, Kansas & Nebraska*.—W. D. Mann has been appointed Assistant General Passenger and Ticket Agent. John T. Smith has been appointed Traveling Passenger Agent.

W. D. Mann has been appointed Assistant General Ticket and Passenger Agent, with headquarters at Topeka, Kan.

*Cincinnati, Wabash & Michigan*.—Darwin F. Coe has been appointed General Freight Agent, and Edgar H. Beckley General Passenger and Ticket Agent, offices at Elkhart, Ind.



**Colorado Midland.**—G. A. Cartwright has been appointed General Freight and Ticket Agent. Darwin F. Coe has been appointed General Freight Agent and Edgar H. Beckley General Passenger Agent.

**Evansville & Indianapolis.**—The old board of directors was re-elected this week. Edwin Taylor was elected President and W. J. Lewis Secretary.

**Evansville & Terre Haute.**—The old board of directors was re-elected this week.

**Illinois Central.**—John Dunn has been appointed Assistant to the General Manager.

**Indianapolis, Decatur & Springfield.**—C. B. McVay has been appointed Purchasing Agent.

**Lake Shore & Michigan Southern.**—D. F. Lillie has been appointed Secretary to President Newell, vice A. E. Sumner, resigned.

**Mexican National.**—Walter Morcom has been appointed General Freight and Passenger Agent of all lines, with office at the City of Mexico. S. H. Bass has been appointed Assistant General Freight and Passenger Agent, office at Laredo, Tex.

**Henry Yonge,** of New York, has been appointed General Superintendent.

**New York, Lake Erie & Western.**—E. O. Hill, late Superintendent of the Eastern Division, has been appointed General Foreman of the shops at Port Jervis, N. Y.

**Ohio & Mississippi.**—Robert Garrett, James H. Smith and Edward Whittaker have been elected directors.

**Paragould & Buffalo Island.**—The directors of this Arkansas company are: Henry Wrape, Adolph Bertig, Samuel Bertig, Joseph Boykin and W. H. Sallis.

**Rome, Watertown & Ogdensburg.**—F. J. Britton has been appointed Superintendent of the Western division, vice W. H. Chauncey, resigned.

**San Pedro, Los Angeles & Utah.**—The directors of this new California company are L. R. Winans, J. P. Woodbury, W. B. King, S. O. Houghton and I. W. Hellman.

**Santa Monica Outlook.**—This company organized last week with Abbott Kinney, President; Patrick Robertson, of Scotland, Vice-President; James Beltner, of Riverside, Cal., Secretary and Treasurer.

**Southern Pacific.**—James Horsburgh, Jr., has been appointed Second Assistant General Passenger and Ticket Agent of the Pacific system.

**Union Pacific.**—The following changes are announced to go into effect Nov. 1: G. M. Cumming, Assistant General Manager, will go to Boston and become assistant to President Adams; George Ady, General Passenger and Ticket Agent at Denver for the Colorado Division, has resigned, and D. B. Keeler, the Assistant General Freight Agent, succeeds him, and combines the two offices. This removes D. L. Sturges, City Ticket Agent at Denver, and promotes E. G. Patterson, who was chief clerk to Ady.

**Wheeling, Wellsburg & State Line.**—The officers of this West Virginia company are: S. George, President; A. B. Paul, Secretary, and David Brown, Treasurer.

#### OLD AND NEW ROADS.

**Alabama Great Northwestern.**—This new company has its line located some 7 miles south of Montgomery, Ala. It will be located to Tupelo, Miss., inside of three months.

**Atchison, Topeka & Santa Fe.**—Orders have been issued by the company to reduce the working time of its employees in the Atchison shops from 10 to 9 hours a day, with 9-hour pay.

**Augusta, Gibson & Sandersville.**—The road will be extended from Sandersville, Ga., to St. Andrews Bay, Fla.

**Batesville & Brinkley.**—The company will extend the road to Black Rock, Ark., 25 miles. The office is in Little Rock, Ark.

**Beauharnois Junction.**—Contracts have been let for building the road from Beauharnois to Valleyfield, Ont.

**Beech Creek.**—A preliminary survey has been completed between this road and the Tyrone & Clearfield. The length of the road will be 28 miles.

**Boston & Maine.**—The freight depot at Newmarket, N. H., was burned last week. Loss, \$35,000 to \$50,000.

**Boston & Providence.**—A second track is being put in on the West Roxbury branch to Dedham, Mass. Next year a second track will be put in over the Readville branch, and then the entire road, except the Stoughton branch, will be double track.

**Boston, Revere Beach & Lynn.**—The company has equipped 10 engines and 20 cars with steam heating apparatus, taking steam from the engine. No patented coupling is used, but one designed by the company.

**Brunswick & Western.**—Bondholders representing \$612,000 have unanimously approved of the scheme for the reorganization of the company arranged between a committee and the Seligmans.

**Buffalo, Rochester & Pittsburgh.**—The company has ordered 1,100 tons of 70-lb. steel rails. The statement is that they are to be used on curves and heavy grades.

**Burlington & Missouri River.**—The Omaha & North Platte branch is completed 20 miles west of Wahoo, on the way to Schuyler, Neb.

**Camden & Atlantic.**—Samuel C. Cooper, one of the largest stockholders in this company, has brought to the notice of the officials of the city of Camden, N. J., that the railroad company has three tracks laid on city property, narrowing Main street down to half its original width. The company has been given five days to remove the tracks and place the street in a condition for travel. The tracks run into the engine house and repair shops.

**Cape Fear & Yadkin Valley.**—The company will build a branch from Stokesdale to Madison, N. C., 11½ miles. The grading contract has been let.

**Carolina, Knoxville & Western.**—The subscription of \$50,000 to this company was voted on and carried by a large majority in Transylvania County, N. C., last week. On Nov. 19, Buncombe County will vote on the proposition of subscribing \$100,000 to this company, \$100,000 to the Asheville & Burnsville, and \$100,000 to the Carolina Central.

**Central Iowa.**—An application was made at Des Moines, Ia., by the Elijah Smith Committee of the main line bondholders to set aside the decree of sale and put the road into the hands of a committee of bondholders. The application was denied, and the sale ordered to take place on Nov. 9.

**Chateaugay.**—It is expected that the road will be finished to Saranac Lake Village, in the Adirondack Mountains, N. Y., by Dec. 20. Grading is rapidly progressing, and about 8 miles of track are laid.

**Chicago, Burlington & Quincy.**—The track is all laid on the Oxford & Kansas, extending from Orleans, Harlin County, Kan., via Wilsonville to the state line, 60 miles. Grading is completed and tracklaying is in progress on the Beaver Valley road, extending from the end of the Oxford & Kansas, west of Wilsonville, to Wano, Cheyenne County, Kan., 72 miles.

**Chicago & Gulf.**—The engineers on the survey of this road are now opposite Escatawpa, Ala., within 50 miles of Mobile.

**Chicago, Milwaukee & St. Paul.**—The company has let a contract to Shepard & Co. of St. Paul, Minn., for 10 miles of road northwest from Goodrich's Mills, near Mather's, Juneau County, Wis.

**Cincinnati, Hamilton & Dayton.**—C. C. Waite, General Manager, says that in case the Ohio courts do not appoint a Receiver for the property, the Vandalia deal made by Henry S. Ives will be carried out by the company.

**Concord.**—Governor Sawyer, of New Hampshire, has vetoed the Hazen bill. He gives as his reason the corrupt methods used to promote its passage in the Legislature, and says that both the Concord and Boston & Maine companies had in attendance a paid lobby, which persistently interfered with the representatives in the performance of their legislative duties.

**Connecticut River.**—It is stated that the company will soon introduce the Barrett system of electric lighting on all its regular passenger trains.

**Crest.**—C. J. Dunlap and others, of Chattanooga, Tenn., have obtained a charter for this road, and will build a line along the Mission Ridge Crest. It will probably be built for light rolling stock only.

**Decatur & South Mountain Mineral Belt Line.**—This company has obtained a charter in Decatur, Ala.

**Denison & Washita Valley.**—The company will put engineers in the field to survey an extension to the coal fields at Lehigh, I. T., about 80 miles from Denison, Tex. Contracts for grading and bridge work will be let at once.

**Denver & Rio Grande.**—The work of laying a third rail on this road from Pueblo, Col., west was begun last week. About 1,000 men are now at work. The road is to be extended from Poncho Springs to Del Norte, Col.

**Duluth, Dakota & Manitoba.**—Foley Bros. & Co. have commenced grading near Grafton, Dak. It is supposed that the line is a branch of the Northern Pacific. It will extend from Grafton to the boundary, and thence to Morden, in Manitoba.

**Duluth & Iron Range.**—The contract for the 30-mile extension to the Chandler mine in Minnesota has been let to Shepard & Winston, of Minneapolis. Work is to be completed April 1.

**Duluth, Pierre & Black Hills.**—The survey of this road is now in progress, the surveyors being at work in Sully County, Dak., going towards Blunt.

**Duluth, Red Wing & Southern.**—It is stated that the consolidation of this project with the Sioux City & Northeastern has been practically agreed upon.

**Duluth, South Shore & Atlantic.**—The road is now open from St. Ignace to Sault Ste. Marie and from Red Jacket and Houghton to St. Ignace, Mich.

**East Tennessee, Virginia & Georgia.**—The following circular has been issued: Under the terms of reorganization of this company, the holders of the ordinary and second preference stock are entitled to vote for 7 out of the 15 directors—the remaining 8 directors being chosen by the first preference stockholders. The second preference stock is entitled to dividend in any year after 5 per cent. has been paid upon the first preference; and when the company shall pay full 5 per cent. dividend for two successive years on the first preference stock, then its preferential voting power will cease and all classes of stock will rank equally for voting. It is desirable that the junior securities should be represented in the board, and to that end the undersigned solicit proxies to be used at the next annual meeting (Nov. 16), to elect 7 directors in behalf of the ordinary and second preference shares. Proxies have already been received from foreign stockholders representing over \$6,000,000 stock. Proxies should be filled out in favor of Henry V. Poor, Wm. L. Bull and Richard Irvin, Jr., or either of them, and should be sent to any one of the following firms in New York: Poor & Greenough, Edward Sweet & Co., Richard Irvin & Co.

**Forest City & Watertown.**—The road is being graded between Forest City, Dak., and Aberdeen, and about 20 miles are ready for tracklaying.

**Forest Park & Central.**—The Farmers' Loan and Trust Co. of New York has filed a bill in equity in St. Louis to foreclose the mortgage on this road. The bill recites that in 1884 the St. Louis, Kansas City & Colorado owned the road and this year it came under the control of the Atchison, Topeka & Santa Fe. The mortgage was made in December, 1882, and one condition was that a default in interest for six months made the principal due. The bill alleges default in several particulars.

**Fremont, Elkhorn & Missouri Valley.**—Track is laid to Hastings, Neb.

**Grand Southern.**—The corporation of Calais, Me., will offer the New Brunswick Company \$80,000 to build a road from Princeton to Mattawamkeag, on the European & North American, 30 miles.

**Kansas City, Fort Smith & Southern.**—The Splitlog Construction Co., which has been building this road, has discharged all of its employees. The directors were dissatisfied with the way the work was being conducted.

**Kansas Pacific.**—Jay Gould and Russell Sage, as trustees of the consolidated mortgage of this company, and as individuals, have been sued in the Supreme Court of New York County, by Adrian Stoop and Jan Otto William Franz Reus, on behalf of the holders of the consolidated bonds. The plaintiffs ask that Messrs. Gould and Sage be held accountable to the bondholders for about \$6,000,000. It is also asked that a receiver be appointed pending the litigation.

**Lake Erie, Essex & Detroit River.**—The line is being surveyed from Walkerville to Lewington, Ont., 39 miles, and construction work will be soon begun. John McAfee, of Harrow, is Chief Engineer.

**Lake Shore.**—The railroad committee of the New Hampshire Legislature had a long hearing this week on the question of building this road, which is projected from Alton

Bay to Gilford or Laconia, N. H., 18 miles. It is an enterprise of the Concord road, which wants permission from the Legislature to assist in its construction, but without obligation.

**Lancaster & Hamden.**—The contract for building this Ohio road has been let to James H. Kyner, of Colorado. Work will begin Nov. 1.

**Louisville & Nashville.**—President Norton says that the company will probably soon decide to double track the road from Birmingham to Decatur, Ala.

**Marion & Indianapolis.**—Marion, Ind., has voted \$40,000 to this company. The donation is made on condition that the shops of the company are built at that town.

**Memphis & Charleston.**—It is understood that the contract for building the road from Stevenson, Ala., to Chattanooga, Tenn., will be let at once.

**Milwaukee, Lake Shore & Western.**—The company has let a contract to Henry Balch, of Minneapolis, Minn., for an extension of 40 miles northwest from Rhinelander, Wis. A resolution has been passed to extend the Rhinelander branch a distance of 75 miles to a junction with the main line at Huron.

**Minneapolis & Pacific.**—It is stated that the Aberdeen, Bismarck & Northwestern has come under the control of this company, and that a part of the road will be completed during the present year. This would give the Minneapolis & Pacific a line from Minneapolis, Minn., to Bismarck, Dak.

**Minneapolis, Sault Ste. Marie & Atlantic.**—The grading from Gaze, Wis., the present terminus, to Sault Ste. Marie, Mich., is about completed and some 400 men are now engaged in tracklaying. Since the first of August, 200 miles of new track have been laid, making 342 miles now down. Between Minneapolis and Gladstone there are gaps to be filled amounting to 26 miles. This will be completed by Nov. 15. It is expected to have the section between Gladstone and Sault Ste. Marie finished by Dec. 1.

**Missouri Pacific.**—Track is laid to a point within 95 miles of Pueblo, Col., and that city will be reached by Nov. 10. More than 1,000 men are now at work. Pueblo will be the Western terminus of the Missouri Pacific, and extensive shops are to be built there. The first division terminus east will be at Chivington, 120 miles.

**Nashville, Chattanooga & St. Louis.**—The Elora branch, from Elora, Tenn., to Huntsville, Ala., has been completed and put into operation.

**Naugatuck.**—The pooling arrangement between this and the New Haven & Derby road by which the gross earnings of the two roads have been pooled and divided monthly since 1879, the Naugatuck road taking 81.19 per cent. and the Derby 18.81 per cent., has been canceled.

**Newburgh & Poughkeepsie.**—Representatives of this company are serving notices on property owners whose land they expect to use in the building of the road. The line will run from near Cornwall, N. Y., through Vail's Gate to the city of Newburgh, and thence to the western end of the Poughkeepsie Bridge. The survey will soon be made.

**New Orleans, Natchez & Fort Scott.**—Work will begin on this road at Vidalia, La., on Nov. 1. The length of the line as projected is 660 miles. Lands and money to the amount of more than \$2,000,000 have been donated.

It is stated that all the subsidies, amounting to more than \$2,000,000, have been secured, and they will at once be placed as collateral for sufficient money to begin active building operations immediately.

**New Roads.**—The Massachusetts Railroad Commissioners have decided that public necessity does not require the construction of a road from East Wareham to Onset Bay Grove, Mass., as petitioned for.

**New York & Boston Rapid Transit.**—A company of 18 men is reported to be at work on the survey of this road through South Wrentham Mass.

**New York, Mahoning & Western.**—A proposition has been made by the Brice-Thomas syndicate to run the road through Findlay, O., and to locate the shops there, making that city the head of the division. The syndicate asks for six acres of land, the right of way, and a subscription of \$50,000, and agrees to begin work at once. The citizens have appointed a committee to solicit subscriptions.

**New York, New Haven & Hartford.**—A plan is under consideration to put in track tanks on this road near New York, the cost of water taken by engines in that city being very heavy.

The company has given a contract to Harlan & Hollingsworth, of Wilmington, Del., for two iron tugs, each 100 ft. long, 20 ft. beam, and 12 ft. depth of hold.

**Norfolk & Western.**—The company has contracted for a 2,400 ton steamer for carrying coal from Norfolk, Va., to New York.

**Nottingham Railroad & Improvement Co.**—The company will extend its road from Alpine, Ala., 20 miles to a point on the Columbus & Western. It will also be extended eastward 10 miles from Nottingham to the Anniston & Cincinnati.

**Ohio & Northwestern.**—This road will be changed to standard gauge on Oct. 23. It extends from Cincinnati to Portsmouth, O., 103 miles.

**Oregon Pacific.**—About 3,000 men are now working on the road along a surveyed line from South Santiam River, Oregon, eastward. The road is now completed for 96 miles east of Yaquina City, the Western terminus. Trains are running over 12 miles of track east of Albany on the line of the Oregon & California, which road the Oregon Pacific crosses at that point.

**Paragould & Buffalo Island.**—Incorporated in Arkansas. The company will build a road from Paragould through Green County eastward to a point on the eastern side of St. Francis River, 8 miles.

**Pennsylvania.**—Among the improvements on the Monongahela Division since the first of the year are the following:

A new foot bridge has been erected over the tracks at Fifteenth street, South Pittsburgh, of 56 ft. span.

A 20-ft. arch for 6 trucks is being built at Munhall's Run; Friday & Watt, of Pittsburgh, contractors.

A 20-ft. double track arch bridge is being built at Lobb's Run, Messrs. Friday & Watt being the contractors for the work.

A 40-ft. double track arch is being built at Mingo Creek by Harold & McDonald, of Pittsburgh. The trestles at the above points, aggregating 1,550 ft. in length, will be filled as soon as possible after the completion of the arches, all of which are to be completed by Dec. 15.

A highway bridge was erected over the track at south end of the Monongahela River bridge of 60 ft. span.



**Pennsylvania & New England Construction Co.**—President Husted promises that the roads which this company has in charge will be completed from Springfield, Mass., via the Hartford & Connecticut Western to Poughkeepsie, and thence to Slatkington, Pa., by the first of next July.

**Philadelphia & Reading.**—The reconstruction trusts have unanimously ratified the terms of settlement agreed upon by President Corbin and W. H. Kemble. This prevents the necessity of foreclosure. Of the \$117,000,000 of Reading securities \$116,127,776 are now assented to the reorganization plans, and, including the securities of the Schuylkill Navigation Co. and the Susquehanna Canal Co., the deposits amount to \$128,310,816 out of a total issue of \$133,564,827, leaving less than 4 per cent. outstanding.

Edwin Parsons, as a general mortgage bondholder and intervening plaintiff in the Robinson suit: Hugh H. Penny and Alfred Sully, as income mortgage bondholders and intervening plaintiffs in the Keisey suit, and Samuel W. Bell, as Trustee under the income mortgage, have filed exceptions in the United States Circuit Court to the report of Masters Pollock and Dallas, recommending the foreclosure decree. Mr. Parsons excepts, first, upon the ground that the Masters erred in not including in the property to be sold under the general mortgage the leasehold interests in the North Pennsylvania and Bound Brook roads. Second, by reason of providing in the order of sale that all bidders, before making a bid, shall pay to the Trustee \$500,000 as evidence of good faith, \$25,000 as to the branches and leasehold interests, and \$500,000 as to the bond and mortgage of the Coal & Iron Co. Third, because they have not provided that in applying the proceeds of the sale to the payment of interest on the general mortgage, the general mortgage scrip, amounting to \$825,660, should be excluded. Fourth, in not including as a charge upon the fund Mr. Parsons' outlays, expenses, etc., in the proceeding. Fifth, because the Masters held that the proceeds arising from the sale of the bond and mortgage of the Coal & Iron Co. should be applied first to pay principal and interest of the consolidated bonds. Sixth, in holding that no sale of the mortgaged property be confirmed unless the bid therefore or the aggregate of the bids, if sold in parcels, shall amount at least to \$500,000. The findings that the Trustee may adjourn the sale to be made and the form of advertisement for the sale, which states that bidders shall be required before making a bid to pay the Trustee the sums mentioned above as evidence of good faith, are also excepted to.

Among the reasons given by Mr. Penny for exceptions to the report are that the masters did not hold the income mortgage to be a lien on the leasehold interests of the North Pennsylvania, Bound Brook, Shamokin, Sunbury and Lewisburg roads, as well as on all the Reading property, because they did not find that the conveyance to the Trustee of the mortgage of the income of the Reading's business was a mortgage on all the property of the Reading, acquired and to be acquired, and because they reported that the German town, Norristown, Chestnut Hill, Plymouth and the Tabor branches could be offered for sale separately.

The exceptions in behalf of Mr. Sully and Mr. Bell include objections to the Masters not finding the income mortgage was a lien on all Reading's leases acquired since Dec. 1, 1876, the date of the mortgage; to their not reporting that it was a lien on the North Pennsylvania, Bound Brook, and Shamokin, Sunbury, and Lewisburg railroads, besides being a lien on all the Reading property; not finding that the consolidated 5 per cent. mortgage of Aug. 1, 1882, was posterior to it, and also in not reporting that all the judgments obtained against the road are posterior in lien to the income mortgage.

**Pittsburgh & Lake Erie.**—The master in the case of Cornelius Vanderbilt against this company has decided that the trust deed is invalid. This gives the Vanderbilts control of the road and takes it out of the hands of the trustees.

**Port Jervis, Monticello & New York.**—Work on the extension of this road from Huguenot to Summitville, N. Y., is now in active progress, there being several gangs at work between Huguenot and Wurtsboro.

**Pullman Palace Car Co.**—The capital of this company has been increased from \$13,920,000 to \$20,000,000. President Pullman recommended the increase, stating it to be for the purpose of providing the capital required to meet the cost of additional equipment and for further extension in the near future.

**Red River Valley.**—Foley Brothers, contractors, who completed the Northern Pacific branch to the boundary, have submitted an offer to the government to complete the Red River Valley road by Jan. 1, and take provincial bonds for pay.

**St. Louis, Arkansas & Texas.**—The extension from Corsicana to Hillsboro, Tex., will be finished by Nov. 15. Fifteen miles of track have been laid in Corsicana. The building of bridges has delayed the tracklayers.

The meeting of stockholders in St. Louis on Oct. 20 is for the purpose of perfecting the consolidation of the Little Rock and Shreveport branches with the main line.

**St. Louis, Keokuk & Northwestern.**—This road, extending from Keokuk, Ia., to St. Peters, Mo., 136 miles, was sold at special sale on Oct. 15 to C. E. Perkins for \$4,000,000. The purchase was made for the Chicago, Burlington & Quincy, which is the lessee of the road.

**St. Lawrence, Lower Laurentian & Saguenay.**—There has been 22 miles of track laid on the Canadian road, and 22 miles more are being built to Riviere Pierre on the Quebec & Lake St. John Railroad.

**St. Louis, Vandalia & Terre Haute.**—The case to set aside a perpetual lease of this road to the Terre Haute & Indianapolis came up this week in Chicago before Judges Gresham and Allen. The lease ran 999 years from 1868, and by its terms the lessee was to retain 70 per cent. of the gross earnings for operating expenses, the remainder to be turned over to the lessor, with which to pay interest on bonded debt, etc. The lessor now claims a balance of \$500,000 due it, which the Terre Haute and Indianapolis road does not deny, but puts in a counter claim of \$300,000 expended for betterments, etc. The lessor asks to have the lease cancelled, on the ground that it had no power to make such a lease, nor the Terre Haute & Indianapolis any power to accept it. A demurrer is filed to the bill, on the ground that it seeks to set aside the lease and yet recover rent due under it, and also because complainant, having acquiesced in the lease so long, cannot now attack it.

**St. Paul, Minneapolis & Manitoba.**—Plans have been prepared for new and extensive freight-houses at Minneapolis. They include the building of out and in freight-houses and changes in the yard and tracks. It is proposed also to add freight house facilities at St. Paul next season.

**St. Paul, Minneapolis & Manitoba.**—Surveyors are running a line from Great Falls, Mont., via Flathead Lake, the Kootenai country and across the Pend d'Oreille River. It is intimated that this may indicate a continuation of the road through to Puget Sound.

Shepard, Winston & Co. have built 545 miles from Minot, Dak., to Great Falls since April 2. The record of progress by

months is shown as follows, the distance being given west of Minot:

	Miles.		Miles.
April 2.....	2.0	Aug. 1.....	292.30
May 1.....	35.1	Sept. 1.....	407.50
June 1.....	111.1	Oct. 1.....	509.30
July 1.....	191.7	Oct. 15.....	549.75

The largest month's record was in August, and the largest week of any seven days was from Aug. 6 to 13 inclusive, 32.5 miles being laid. The largest individual day's work was that gigantic record of Aug. 11, when 42,300 ft. were laid between daybreak and dark, the end of the track being 325.6 miles from Minot in the morning and 333.8 miles from Minot at night. The end of the track is now 1,073 miles west of St. Paul.

**San Antonio & Aransas Pass.**—The company will build machine shops at San Antonio, Tex., at an expense of \$35,000 or \$40,000.

**San Pedro, Los Angeles & Utah.**—Incorporated in California to build a line from Rattlesnake Island, on San Pedro Bay, through Los Angeles and Pasadena, then through the counties of Kern, Inyo, etc., by Owen's Lake to a connection with the Union Pacific in Utah. The incorporators are the persons who recently bought Rattlesnake Island for \$300,000, about the purchase of which there was some mystery. The articles of incorporation also provide for a branch road from the main line to Redondo Beach, a new seaside resort.

**Santa Monica Outlook.**—The building of the road will commence within a few days. It is a beach railroad at Santa Monica, Cal., similar to the one at Coney Island, N. Y.

**Seattle & West Coast.**—Earle & Co. have the work on this road between Woodville and Snohomish City, Wash. Ter., more than half done. The work will be prosecuted all winter. A large hotel is being built at Fiddler's Bluff, on the line for the workmen to board in. All the timber for the trestles is ready to put in. The junction of this road with the Seattle, Lake Shore & Eastern is at Bear Creek, opposite Woodville. Earle & Co. have about 500 men at work on the two roads.

**Shreveport & Arkansas.**—Tracklaying has begun on this road at Louisville, Ark.

**Silverton.**—Tracklaying is in progress on this narrow-gauge road from Silverton to Red Mountain, Col., 12 miles.

**Southern Pacific.**—Work on the Placerville extension has begun at Shingle Springs, Cal. One thousand men are at work there and the force will be increased to 2,000.

**Texas, Sabine Valley & Northwestern.**—Grigsby Bros., associated with William Bradburn, late Chief Engineer of the Texas & Pacific, are the contractors for the extension from Tatum to Carthage, Tex. The rails are expected to arrive from England about Nov. 10. Tracklaying will begin about Dec. 1.

**Toledo, Ann Arbor & Northern.**—Work was begun last week on the company's shops at Owosso, Mich. An engine-house, 80 by 200 ft., capable of accommodating 35 locomotives, will be erected.

**Toledo, Saginaw & Mackinaw.**—McRae, Lally & Son, of Detroit, have been awarded the contract for building this road between East Saginaw and Durand, Mich. Work begins at once, and is to be finished by next July.

**Warrior Coal Fields.**—Dunn Bros., of Birmingham, have the grading contract on this road from Meridian, Miss., to Gainesville, Ala., 56 miles.

**Wheeling, Wellsburg & State Line.**—This company has been organized in West Virginia.

**Winona & Southwestern.**—The survey of this road is completed from Winona, Minn., to Mason City, Iowa.

## TRAFFIC AND EARNINGS.

### The Inter-state Commission.

A circular has been issued to the railroads, a copy of which has also been sent to state railroad commissioners and others, stating that a hearing will be held at Washington, Oct. 25, to consider what action shall be taken under section 20 of the law, which provides that the Commission may require annual reports from the railroads.

The Commission on Oct. 12 heard arguments in the cases against the Oregon Railway & Navigation Co., alleging excessive charges on wheat between Walla Walla and Portland. Evidence was taken concerning the cost of operating the road, which, being excessive on account of unusual grades and curves and danger from snow and earth slides, is claimed by the company to furnish ground for higher than ordinary charges.

On Oct. 18 the case of Leverett Leonard, of Mt. Leonard, Mo., against the Union Pacific, was heard. The complaint was that 38 per cent. above regular rates had been charged for transportation of live stock in Burton stock cars. After a brief argument the complaint was dismissed without prejudice for want of proof.

### Anthracite Coal Tonnage

For month of September, 1887, and the year ending Sept. 30, as reported by John H. Jones, Official Accountant, was as follows, the statement including the entire production of anthracite coal, excepting that consumed by employees and for steam and heating purposes about the mines:

	Sept.-ember-1887.	For year 1887.	For year 1886.
Phila. & Reading.....	736,302	5,917,709	5,366,257
Central of N. J.....	391,544	492,548	3,652,048
Lehigh Valley.....	471,821	533,112	4,701,076
Del. & Lack. & West.....	506,614	452,371	4,078,526
Del. & Hud. Canal Co.....	404,778	292,832	2,793,595
Pennsylvania.....	531,039	322,285	2,748,025
Pennsylvania Coal Co.....	148,951	155,751	1,096,809
N. Y., L. E. & W.....	56,005	55,864	594,514
Total.....	3,137,654	2,896,472	25,001,450

The stock of coal on hand at tidewater shipping points, Sept. 30, 1887, was 394,748 tons; on Aug. 31, 629,415 tons; decrease, 234,667 tons.

### Minneapolis Flour Shipments.

The shipments of flour from Minneapolis eastward by all lines for the year ending with September amounted to 5,936,691 barrels. The percentages by the different lines were as follows:

	Barrels.	Per cent.
Chicago, Burlington & Northern.....	2,112,886	35.60
Chicago, Milwaukee & St. Paul.....	1,474,065	24.15
Chicago, St. P., M. & Omaha.....	1,347,763	21.01
St. Paul & Duluth (thence via Lake Superior).....	589,495	9.93
Minneapolis & St. Louis.....	265,706	4.47
Minnesota & Northwestern.....	164,080	2.77
Wisconsin Central.....	122,630	2.07

The large percentage taken by the Chicago, Burlington & Northern is attributed to the favor shown by Minneapolis

shippers, who in this way show their gratitude for the road's action in reducing rates. This road carried over 100,000 bbls. (in October) before the regular opening, which was not until Nov. 1.

### Two-Thousand Mile Tickets.

A Chicago despatch of Oct. 19 says that the Western States Passenger Association has voted to issue 2,000-mile tickets at \$40 each, or 2 cents per mile.

### Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of September:			
Atch., T. & S. F.	\$1,465,474	\$1,461,157	I. \$4,317 .2
Bur., C. R. & No.	269,062	297,853	D. 28,791 9.6
Cap. F. & Y. V.	27,064	20,580	I. 7,584 35.8
Central of Iowa.	122,373	124,354	D. 1,981 1.6
Ches. & Ohio	416,527	388,991	I. 27,536 7.0
Ches. O. & S. W.	186,731	160,944	I. 25,787 16.0
Cin. J. & Mack.	52,747	41,283	I. 11,464 30.1
Cin. N. O. & T. P.	309,917	256,292	I. 53,625 20.9
Ala. Gt. South.	137,863	104,429	I. 33,434 32.0
N. Ori. & N. E.	55,332	45,862	I. 9,470 22.8
Vicks. & Mer.	51,939	36,401	I. 15,538 42.6
V. Shre. & P.	58,816	44,385	I. 14,431 32.5
Total, C. N. O.	614,867	487,376	I. 127,491 26.1
Cl. C. C. & I.	415,193	426,078	D. 11,485 2.6
Cleve. & Marietta	26,911	25,095	I. 1,816 7.2
Col. & Cin. Mid.	31,267	34,426	D. 3,159 9.1
Den. & R. G.	773,076	644,034	I. 129,042 19.6
Det., B. C. & N.	43,009	19,360	I. 23,649 121.5
Det., M. & Marq.	43,227	31,556	I. 11,671 21.5
Flint & P. M.	21,469	179,155	I. 42,314 23.6
Fla. Ry. & N. Co.	70,256	69,047	I. 1,209 10.4
Grand Tr. of C.	1,642,317	1,547,416	I. 94,901 6.1
Gulf, Col. & S. F.	290,645	216,992	I. 82,653 38.1
Illinois Central:			
Ill. River & M.	663,200	663,256	D. 56 0.0
Southern Div.	370,400	306,745	I. 63,655 26.7
Cedar F. & M.	13,220	10,638	D. 2,582 20.7
Dub. & Sioux C.	81,300	102,235	D. 20,935 20.4
I. F. & S. City	55,900	71,160	D. 15,260 21.4
Ind., Bloom. & W.	253,408	253,361	I. 47 0.0
Ind., Ill. & Iowa.	15,243	13,178	I. 2,065 15.6
Ind., Dec. & Spr.	37,877	38,569	D. 692 1.8
K. C., Ft. S. & G.	218,698	214,553	I. 4,145 3.3
K. C., Sp. & Mem.	179,781	134,553	I. 45,228 33.6
K. C., Cl. & Spr.	21,168	18,474	I. 2,694 14.5
Ken. & West	31,868	29,785	I. 2,083 6.9
Lehigh & H. R.	17,497	18,696	D. 1,199 6.4
L. Rk. & M.	84,451	68,247	I. 16,204 23.7
Lou. N. O. & T.	181,748	126,959	I. 54,789 43.9
Mar. C. & N.	6,611	3,591	I. 3,020 11.5
Ma. q. H. & O.	140,283	117,639	I. 22,644 10.3
Min. & N. W.	182,679	54,723	I. 127,956 333.9
Miss. & Tenn.	39,785	32,071	I. 7,714 24.0
Nash. C. & St. L.	270,147	223,311	I. 46,836 20.9
N. Y. C. & H. R.	3,406,481	3,058,548	I. 347,933 11.1
N. Y. City & No.	53,727	50,275	I. 3,452 6.8
N. Y. & N. E.	42,740	22,349	I. 20,391 91.2
Ohio Southern	32,882	53,101	D. 20,219 4
Pitts. & West	180,755	151,862	I. 28,893 22.9
Rich. & Danville	471,800	365,297	I. 106,503 29.1
Va. Mid. Div.	151,200	163,800	D. 12,600 7.6
Chas. C. & A.	69,600	61,380	I. 8,220 13.3
Col. & Gr. Div.	45,300	41,846	I. 3,454 8.2
West. N. C. Div.	70,000	60,306	I. 9,694 17.4
W. O. & W.	18,200	16,300	I. 1,900 11.5
Ash. & Sp. Div.	9,200	7,900	I. 1,300 16.4
St. L. A. & T. H.	216,910	188,023	I. 28,887 15.3
Main Line	90,790	78,695	I. 12,095 13.3
Branches	126,120	109,328	I. 16,792 13.3
Shenandoah Val.	9,000	85,221	I. 7,770 10.3
Texas & Pacific	551,047	508,567	I. 42,480 8.0
Val. P. & W. Est.	87,674	87,674	I. 0 0.0
Valley (Ohio)	59,612	57,934	I. 1,678 2.8
Total.....	\$14,888,195	\$13,292,780	I. \$1,712,690 ....
Net.....			D. \$117,275 .....
			I. 1,595,415 12.0

Month of August:			
Cape F. & Y. V.	\$22,326	\$20,248	I. \$2,078 10.2
Net.....	10,921	10,806	D. 115 0.0
C. I. St. L. & C.	237,453	236,482	I. 971 .4
Net.....	97,864	97,867	D. 3 0.0
Mexican National	139,793	147,573	D. 7,780 5.2
Net.....	11,136	17,723	D. 6,587 37.2
Oregon Imp. Co.	428,193	317,045	I. 111,148 25.9
Net.....	157,779	117,473	I. 40,306 34.3
Rome, W. & O.	347,025	307,972	I. 39,053 12.6
Net.....	180,156	169,408	I. 10,748 6.3
St. L. A. & T.	217,115	145,247	I. 71,868 49.5
Net.....	76,650	33,608	I. 43,042 128.1
South. Pac. Co.:			
Gal. H. & S. A.	280,064	231,856	I. 48,208 20.7
Net.....	88,753	52,990	I. 35,763 67.4
Louisia. & West	82,484	54,723	I. 27,761 50.7
Net.....	44,863	28,633	I. 16,230 36.5
Morgan's L. & T.	339,602	300,083	I. 39,519 9.8
Net.....	92,145	68,947	I. 23,198 33.6
N. Y. Tex. & Mex.	15,735	14,479	I. 1,256 8.3
Net.....	5,521	3,591	I. 1,930 53.6
Texas & N. O.	121,54	76,644	I. 44,900 57.9
Net.....	66,282	29,717	I. 36,565 123.1
A. I. Sys.	838,669	686,785	I. 151,884 22.1
Net.....	297,586	183,899	I. 113,687 91.4
Pac. Sys.	2,459,116	2,120,825	I. 338,291 27.2
Net.....	1,463,750	1,067,729	I. 396,021 37.0
Tot. So. Pac. Co.	3,538,115	2,807,611	I. 730,504 26.0
Net.....	1,761,336	1,251,629	I. 509,707 40.7
Tol. & Ohio Cen.	65,206	70,391	I. 5,185 35.2
Net.....	25,246	12,613	I. 12,633 100.2
Total (gross).....	\$5,025,226	\$4,052,569	I. \$972,657 15.2
Total (net).....	2,320,988	1,711,187	I. 616,456 ....
Net.....			D. \$6,655 .....
			I. 609,801 35.6

Eight months—Jan. 1 to August 31:					
Cape F. & Y. Vy.	\$165,223	\$139,664	I	\$25,550	18.3%
Net	70,872	68,040	I	8,832	12.9%
Central of N. J.	7,583,954	6,634,320	I	949,734	14.3%
Net	3,514,438	2,607,350	I	947,143	35.3%
C. I. St. L. & C.	1,737,644	1,653,828	I	84,816	4.9%
Net	672,142	640,617	I	31,525	4.7%
Oreg. Imp. Co.	2,008,988	1,858,172	I	750,816	40.4%
Net	704,765	450,814	I	247,951	34.2%
Rome, Wat. & Og.	2,020,001	1,802,891	I	217,710	10.8%
Net	852,757	737,286	I	115,471	13.6%
So. Pac. Co.					
Gal. & H. S. A.	2,090,461	1,701,771	I	388,690	22.8%
Net	297,120	311,440	I	86,021	29.0%
Louisia. & W. Me.	534,904	411,990	I	122,910	29.8%
Net	247,887	205,750	I	42,137	20.7%
Mor. L. & T.	2,570,000	2,550,050	I	20,011	.7%
Net	458,325	560,435	D	102,110	18.2%
N. Y. T. & M.	197,798	92,820	I	14,078	10.1%
Net	7,070	Def. 5,430	I	13,339	
Texas & N. O.	807,928	625,027	I	183,001	22.6%
Net	371,960	283,557	I	88,403	23.8%
Atlantic System	6,120,157	5,390,638	I	729,499	11.9%
Net	1,382,663	1,234,471	I	148,192	13.5%
Pacific System	16,757,952	14,892,515	I	1,865,437	12.5%
Net	7,785,966	7,413,357	I	352,309	4.7%
Total So. Pa. Co.	22,878,370	20,283,174	I	2,394,933	12.7%
Net	9,148,329	8,847,829	I	550,500	5.7%
Tol. & Ohio C.	646,232	492,908	I	153,051	23.5%
Net	194,267	133,808	I	60,459	31.1%
Total (gross)...	\$37,640,666	\$32,802,100	I	\$4,777,566	14.5%
Total (net)...	15,293,571	13,381,000	I	1,911,881	14.3%



## Nine months—Jan. 1 to Sept. 30:

	1887.	1886.	Inc. or Dec.	P. c.
Atch., Top. & S. Fe	\$13,593,387	\$11,047,786	I. \$2,545,601	23.4
Atlantic & Pacific	1,934,296	1,051,966	I. 882,330	83.7
Buff., N. Y. & Phil.	2,064,406	1,942,360	I. 122,046	6.2
Buff., R. & Pitts.	1,472,920	1,026,229	I. 446,691	43.5
Cairo & Chic.	557,131	470,430	I. 86,701	18.4
Calif. St. L. & P.	1,014,025	496,510	I. 517,515	104.1
Chi. & W. Mich.	4,218,064	3,471,052	I. 747,012	21.5
Chi. & W. Mich.	1,056,755	1,030,531	I. 26,224	2.5
C. Ind. St. L. & C.	1,883,414	1,898,204	I. 14,790	0.8
Cl. N. O. & T. Pac.	2,436,796	2,048,561	I. 388,235	18.4
Ala. Gt. South.	1,098,373	829,722	I. 268,651	32.3
New Or. & N. E.	462,250	422,063	I. 40,187	9.5
Vicks. & Mer.	304,254	343,457	I. 39,203	11.4
Vicks. & Mer.	369,703	311,071	I. 58,632	18.8
Chic. & St. L.	302,384	278,220	I. 24,164	8.7
Chic. & St. L.	1,395,666	1,481,119	I. 85,453	6.1
Clev. & Canton.	271,379	262,611	I. 8,768	3.3
Col. H. V. & Tol.	1,947,745	1,615,896	I. 331,849	20.5
Den. & R. G. W.	809,860	747,253	I. 62,607	8.4
Det. L. & Nor.	848,289	892,703	D. 44,414	5.2
Et. W. & Den. C.	485,145	284,895	I. 200,250	70.2
Gr. Rap. & Ind.	1,750,700	1,483,363	I. 267,337	18.0
Hous. & Tex. C.	1,856,638	1,867,403	D. 10,765	0.6
Ill. Cent. (H. Div.)	5,389,137	4,844,433	I. 544,704	11.2
Southern D. V.	2,740,636	2,642,650	I. 97,986	3.7
Cedar F. & Min.	92,834	126,066	D. 33,232	35.8
Dub. & S. C.	596,852	676,729	D. 79,877	13.4
Iowa & S. C.	469,725	441,675	I. 28,050	6.3
Louis. & Nashv.	11,557,069	10,042,215	I. 1,515,454	15.0
Louis. N. C. & C.	1,658,959	1,345,934	I. 313,025	23.2
Milw. L. S. & W.	2,469,675	1,690,802	I. 778,873	45.8
Milw. & Nor.	696,934	459,728	I. 237,206	51.5
Mobile & Ohio	1,744,941	1,448,244	I. 296,697	20.5
N. Y. Cen. & H. R.	25,337,725	23,629,760	I. 1,707,965	7.2
N. Y. C. & Nor.	428,798	402,041	I. 26,757	6.6
N. Y. Cen. & W.	1,154,901	1,011,277	I. 143,624	14.2
Ohio & Miss.	3,036,388	2,837,512	I. 198,876	6.9
Rich. & Dan.	3,102,832	2,872,382	I. 230,450	8.0
Ya. Mid. Div.	1,191,577	1,196,050	D. 4,473	0.4
Char. Col. & A.	684,947	539,006	I. 145,941	27.1
Col. & Gr.	357,689	414,241	D. 56,552	13.6
West. No. Car.	519,746	392,766	I. 126,980	32.3
Wash. O. & W.	92,300	84,200	I. 8,100	9.6
Ash. & S. P.	47,316	29,487	I. 17,829	60.4
Tot. Rich. Ter. Co.	5,876,258	5,408,732	I. 467,526	8.6
St. L. A. & Tex.	1,697,682	1,190,602	I. 507,080	42.5
St. P. & Du.	1,170,583	1,087,900	I. 82,683	7.6
St. P. M. & M.	5,608,187	4,966,607	I. 641,580	12.9
St. P. & O. Cen.	751,990	573,744	I. 178,246	31.2
Wabash West	4,818,128	4,233,210	I. 584,918	13.8
Total	\$126,523,805	\$109,639,178	I. \$16,884,627	15.4
Net			I. 16,884,627	15.4

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

## Coal.

The coal tonnages for the week ending Oct. 15 are reported as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Anthracite	717,929	781,012	D. 63,083	8.0
Bituminous	277,784	241,180	I. 36,604	15.1

The Cumberland coal trade for the week ending Oct. 15 amounted to 63,639 tons, and for the year to that date, 2,515,367 tons.

The coal tonnages of the Pennsylvania road for the week ending Oct. 15 are reported as follows:

	Coal.	Coke.	Total.
Line of road	198,073	87,573	285,646
Year to Oct. 15	8,007,803	2,786,000	10,793,803
To Oct. 15, 1886	6,073,581	2,734,623	8,808,204

## Cotton.

The cotton movement for the week ending Oct. 14 is reported as below, in bales:

	1887.	1886.	Inc. or Dec.	P. c.
Interior markets	177,314	16,441	I. 160,873	9.1
Shipments	175,733	130,164	I. 45,569	34.9
Stock	179,580	143,853	I. 35,727	24.8

	1887.	1886.	Inc. or Dec.	P. c.
Receipts	276,876	230,258	I. 46,618	20.2
Exports	142,441	136,704	I. 5,737	4.1
Stock	524,325	440,738	I. 83,587	17.0

## East-bound Shipments.

The shipments of grain, flour and provisions from Chicago eastward to seaboard points amounted last week to 39,591 tons, against 36,058 tons for the preceding week. The percentages carried by the different roads were: Wabash, 6.1; Cincinnati, Indianapolis, St. Louis & Chicago, 4.5; Michigan Central, 12.7; Lake Shore & Michigan Southern, 9.9; Pittsburgh, Fort Wayne & Chicago, 11.9; Chicago, St. Louis & Pittsburgh, 17.2; Baltimore & Ohio, 10.3; Chicago & Grand Trunk, 13.4; New York, Chicago & St. Louis, 8.2; Chicago & Atlantic, 5.6.

## Consolidation of Classifications.

The committee of fifteen which has been at work endeavoring to combine the trunk line and the joint western classifications, on a basis of eight classes, has adjourned and will next meet in New York, Oct. 25.

## Montana Rates.

The near approach of the time when the St. Paul, Minneapolis & Manitoba will be able to take freight to and from Helena has made some disturbance in freight rates. St. Paul dispatches saying that already freight is taken from there at \$2 per 100 lbs. (first-class) to Benton, which is some 30 per cent. less than the Northern Pacific rate to parallel points. The Union Pacific is interested in Helena traffic, and its officers are said to have had several conferences with the Manitoba with the hope of inducing the latter to maintain rates.

## Per Diem Car Service.

The following named roads, in addition to those already published, have notified the Pennsylvania that they will join it in the use of the new basis for car service: Burlington, Cedar Rapids & Northern; Buffalo, Rochester & Pittsburgh; Norfolk & Western; Newport News & Mississippi Valley; Cumberland Valley. Other lines have said that they will soon adopt the system.

These roads own about 22,000 cars, which, added to the equipment of the Pennsylvania and the Erie, makes a total of 110,000, a very respectable beginning.

## Transcontinental Rates.

A meeting of representatives of roads interested in Pacific coast traffic was held in Chicago, Oct. 18. All the American lines were represented except the Texas Pacific. The Canadian Pacific had been invited to be present, but was not heard from. The meeting was for the purpose of forming some agreement for the maintenance of through rates, but nothing definite was done except to appoint a committee to consider the matter and lay out a plan of action.

## Central Traffic Association.

The general managers of the lines in this association, at a recent meeting in Chicago, passed a resolution providing that the chairman make investigations to detect short-weight billing, and that if anything serious of this kind be discovered, he be authorized to proceed in the courts under the Interstate law against the road found thus discriminating.

At the same meeting it was resolved to see what could be done concerning the adoption of a uniform mileage rate for tank and refrigerator cars.

## Export Rates.

The Central Traffic Association has voted to have all export rates to all Atlantic ports on all classes of traffic regularly reported to the chairman of the Association. It was also voted to invite the Chesapeake & Ohio and other Southern lines to co-operate in the regulation of export rates.

## ANNUAL REPORTS.

## St. Paul, Minneapolis &amp; Manitoba.

The mileage owned and operated by this company at the end of the fiscal year ending June 30, 1887, was:

St. Paul & Minneapolis to Manitoba boundary	805
Crookston Junction (Minn.) to Minot	231
Branches	809
Total	1,845

The increase in road operated during the year was 426 miles. The average operated was 1,739 miles in the last fiscal year and 1,471 in the year ending June 30, 1886. The mileage completed but not in operation at the end of the year was 272, of which 143 was from Minot to the end of the track. The grand total completed, including sidings and second track (28.44 miles), was 2,514 miles, of which 1,853 miles was laid with steel rails.

The new mileage built during the fiscal year and to be completed before the end of 1887, including 262 miles to be graded only, is 1,444 miles, or 95½ per cent. of that under operation July 1, 1886. The new construction included 168 miles to Ellendale and Aberdeen, in Dakota, 294 miles in extension of the main Dakota-Montana line and 39 miles from Rugby Junction northward to Bottineau toward the Manitoba border.

The work under construction to be completed this season includes 354 miles on the Montana extension to Great Falls and 48 miles to Watertown, Dak. The line to be graded but not completed this season is 262 miles, including 147 miles from Wilmer to Sioux Falls, Dak., and 70 miles from Watertown to Huron.

The equipment was 216 locomotives, 156 cars in the passenger equipment and 6,184 cars in freight and work equipment. The equipment contracted for to be delivered during the season is 25 locomotives, 25 cars for passenger service and 1,119 for freight service. The total expenditure for equipment in 1887 will approximate \$1,400,000.

The general account condensed was as follows:

Stock	\$30,000,000
Funded debt	43,389,877
Sinking fund	388,388
State tax not due	93,244
Accrued interest on bonds not due	186,093
Accounts and balances	3,608,988
Fund for improvement and renewal	1,023,946
Profit and loss, balance	2,374.89
Total	\$71,101,025
Less land grant bonds redeemed	3,009,000
Total	\$68,092,025

The increase of funded debt was about 11 million dollars, which corresponds with the increase in valuation of the road, equipment and lands.

The income account was as follows:

Earnings	\$8,078,448
From land department	415,782
Investments and rents	514,447
Total	\$8,958,677
Operating expenses	\$4,009,410
State taxes	2,548,555
Interest	2,170,469
Dividends (6 per cent.)	1,200,000
Transferred to sinking fund from land department	415,782
Transferred to improvements and renewals	600,000
Balance	\$257,591
Total	\$8,958,677

The earnings for the year were as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Freight	\$8,151,747	\$5,587,284	I. \$2,564,463	45.9
Passengers	1,497,809	1,473,412	I. 24,397	1.6
Express	83,540	70,354	I. 13,186	18.7
Mail	33,904	125,262	D. 91,358	26.9
Miscellaneous	161,350	59,423	I. 101,927	171.6
Total	8,928,448	7,321,736	I. 1,606,712	21.9
Express	4,099,410	3,658,404	I. 441,006	12.0
Net earnings	3,929,038	3,663,333	I. 265,705	7.2
Gross earnings	4,617	4,978	D. 361	7.2
Net earnings	2,359	2,491	D. 132	5.2
Per cent. of expenses	51.0	49.5	I. 1.5	3.0

The expenses were divided as follows:

	1887.	P. c.	1886.	P. c.
Conducting Transportation	\$753,618	18.3	\$617,880	16.8
Motive power	1,423,199	34.7	958,023	26.1
Maintenance road and structures	1,198,859	29.2	1,476,709	40.3
Maintenance cars	401,458	9.7	343,933	9.4
General expenses	322,307	7.8	261,779	7.1

The comparative statistics of freight traffic operations for the last two fiscal years, are:

	1886-1887.	1885-1886.	Per cent.
Freight train mileage	1,989,299	1,622,643	Inc. 22.3
No. of tons carried	1,742,210	1,379,004	Inc. 18.5
Tons carried one mile	450,932,488	374,985,532	Inc. 20.2
Earnings from freight traffic	\$6,151,746	\$5,587,284	Inc. 10.0
Average freight earnings per ton-mile	\$ .0136	\$ .0144	Dec. 5.5
Average haul, miles	260	272	Dec. 4.4

"Improvement of the grades and alignment of the older portions of the system has been continued during the year. A large sum has also been expended for ballasting. A large force is being employed in bringing the St. Cloud and Fergus Falls divisions to a uniform maximum grade of 31 ft. to the mile. This work on that portion of the line between St. Cloud and Evansville will be completed in season for the fall business. With the completion of the work of lowering the grades on the Fergus Falls Division, the maximum of grades for the entire system will be 31.6 ft. per mile.

"The uniform policy of this company has been to meet and even to anticipate the wishes of its patrons for reduced rates by lowering its tariffs as rapidly as compatible with the retention of means for improving the property up to, and its maintenance at, a high standard of condition. Since 1881 this process has advanced with such rapidity that the average earnings per ton per mile from the company's freight traf-

fic during the fiscal year lately closed were less than one-half that for the year named, as will appear from the following table of average freight earnings per ton per mile for each of the seven years ending June 30, 1887:

1881	\$ .0288	1885	\$ .0152
1882	.0251	1886	.0149
1883	.0195	1887	.0136
1884	.0170		

The decrease per cent. during the above period is . . . 528

"A new grain tariff was put into effect in the month of August of this year, reducing rates on that commodity about 10 per cent. In January, 1887, our local passenger rates were reduced from 5 to 4 cents per mile in Dakota, making them uniform with those in Minnesota. This reduction, with our round trip rate of 3 cents per mile in both Minnesota and Dakota, has lowered our passenger rates to an average of 2.24 cents per mile for the last fiscal year from 2.44 cents per mile for the fiscal year next previous.

"In the month of April, 1887, the company adopted as the basis for its freight tariffs the classification now in common use throughout the West, known as the 'Joint Western Classification,' which in itself has effected important reductions in the rates on all classified articles. \* \* \*

"The increase of trains and tonnage between St. Paul and Minneapolis, not only of this company, but also of other companies using our lines between these points, has made it necessary to construct two additional main tracks between the two cities. The grading is now well advanced and the rails and ties are on the ground to complete them. These tracks will be laid with steel rails weighing 75 lbs. per lineal yard, and the double track now in use is being relaid with steel of the same weight. The following companies, in addition to our own, use these tracks between the points referred to: The Northern Pacific R. R. Co., the Chicago, St. Paul, Minneapolis & Omaha R. R. Co., the Minnesota, St. Croix & Wisconsin R. R. Co. (Wis. Central Line), the Chicago, Burlington & Northern R. R. Co., the Minnesota & Northwestern R. R. Co. (for passenger business).

"Our interests at Lake Superior, referred to in previous reports, have had further and especial attention during the past year. The Lake Superior & Northwestern, which has undertaken to furnish this company with terminal facilities at that point, and which is the owner of the elevator and other facilities at West Superior, mentioned in our last report, has lately acquired sufficient additional grounds to adequately accommodate the large and growing requirements of this company on the lake. Although the elevator referred to is one of the largest and best planned in the country and fitted with the latest and most approved appliances for handling grain, it has not proven equal to our requirements, and its storage capacity will be increased by the early erection of an annex, giving an additional storage capacity of one and one-half million bushels.

"Plans have been prepared for new and extensive freight houses at Minneapolis, to meet the growing requirements of that city; and their construction only waits the adjustment of certain questions with the city and in the courts. Our improvements contemplate the erection of "out" and "in" freight houses, and the adjustment of our yard and tracks to fully accommodate all business at that city for years to come; the plans being specially designed to afford prompt and inexpensive access to and from our houses and yards for the business public. The extension of our lines also calls for additional freight house facilities at St. Paul, which we expect to provide early next season."

## Chicago &amp; Eastern Illinois.

The annual report of this company for the year ending June 30, 1887, is received. The mileage owned the previous year was 150 miles, and the total operated 246. There is no report made of mileage operated in 1886-7.

The equipment at the close of the last fiscal year was 59 locomotives, 55 cars in passenger service and 4,436 in freight service. Of the latter 2,942 were coal cars. The increase in this account during the year was \$477,343.

The general account is as follows:

Stock	\$3,000,000
Funded debt	8,150,000
Bills and accounts	916,582
Balance to income account	432,338
Total	\$12,498,920
Cost of road	\$7,132,508
New construction	649,449
New equipment	2,360,018
Material and fuel on hand	198,662
Bonds held	1,000,000
Sinking fund account, bonds canceled, etc.	87,264
Cash	68,404
Sundry accounts	367,002
Miscellaneous assets	35,941
Total	\$12,498,920

The earnings were for the last two fiscal years:

	1886-7.	1885-6.	Inc. or Dec.	P. c.
Freight .....	\$1,446,798	\$1,302,138	I. \$144,660	11.1
Passenger .....	360,116	315,282	I. 44,834	14.2
Express .....	52,791	24,776	I. 28,015	112.9
Mail .....	22,377	22,416	D. 39	0.1
Miscellaneous.....	51,978	59,952	D. 7,974	13.1
Total.....	1,934,060	1,724,564	I. 209,496	12.1
*Operating exp's.	1,080,048	957,137	I. 122,911	12.8
Net earnings.....	854,012	767,427	I. 86,585	11.2